THE PLANT DISEASE REPORTER

Issued By

PLANT DISEASE EPIDEMICS
and
IDENTIFICATION SECTION

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

SOME NEW AND IMPORTANT PLANT DISEASE OCCURRENCES AND DEVELOPMENTS IN THE UNITED STATES IN 1956

Supplement 248 November 15, 1957

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Plant Disease Epidemics and Identification Section serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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Crops Protection Research Branch Plant Industry Station, Beltsville, Maryland

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Compiled by Nellie W. Nance

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This summary of some new and important plant disease occurrences and developments has been compiled for the most part from reports to the Mycology and Plant Disease Reporting Section and from articles in Phytopathology. Reports listed in the tables are not usually noted again in the text.

In general drought and below normal temperatures were responsible for reduced prevalence of diseases in 1956. The persistence of below-normal temperature in the Great Lakes and Northeast was considered the outstanding feature of the spring season. Crop damage from record-low May temperatures in the Northeast was estimated at millions of dollars.

WEATHER OF 1956. General Summary. - - Subnormal precipitation which prolonged and intensified the drought in the central and lower Great Plains and Far Southwest to disastrous proportions was the greatest weather news item of 1956. Of far greater importance to the Nation, however, was the combination of weather conditions in most of the remainder of the country, particularly east of the Mississippi River, which favored one of the highest total crop productions on record.

Other major weather highlights of the year included heavy snowfall in the central and northern mountains of the Far West which helped furnish ample irrigation water during the growing season, a cold, wet spring in the northeastern quarter of the Nation which threw agricultural activities 2 or 3 weeks behind schedule, a cool summer and fall in the Great Basin of the Far West, a cold winter in the northern Great Plains, subnormal rainfall in Florida and adjacent areas of adjoining states, and an unusually warm December east of the Continental Divide.

Total storm losses were less than in recent years due mainly to relatively light hurricane damage, although a near-record outbreak of tornadoes caused heavy property losses and frequent hail caused heavy crop losses in north-central areas.

TEMPERATURE. - - Temperatures for the year averaged below normal in the Florida Peninsula, New Jersey, New York, New England, from the upper half of Michigan through the Dakotas, in most sections of the Pacific States, most of Idaho, western Wyoming and northwestern Colorado; but departures were small, exceeding 1° only at a few scattered northern stations. In the remainder of the country averages were above normal with greatest departures occurring in the lower Great Plains where they exceeded 2° at a few stations.

The January temperature pattern showed well above-normal values west of the Continental Divide with greatest departures from normal centered over the lower Rocky Mountain region where the warmest January in nearly 100 years occurred at Tucson, Ariz. The month was also unusually warm in the extreme Northeast and a little warmer than normal in the Great Lakes region, but in other areas east of the Continental Divide temperatures averaged below normal with greatest departures in the extreme Southeast where Miami, Fla., experienced its second coldest January on record. The pattern was reversed in February -- very cold in the western two-thirds of the country and unusually mild in the eastern third. The year's coldest weather occurred in the northern Rockies on February 1-3, when West Yellowstone, Mont., recorded the year's lowest temperature, -52°, on the 1st and a freeze in Arizona caused some crop damage. Average temperatures for the winter of 1956-1957, however, showed no unusual departures from normal.

Spring (March-April-May) temperature averages were relatively high in the lower Great Plains, abnormally low from the Dakotas eastward and near normal elsewhere. The persistence of below-normal temperatures in the Great Lakes and Northeast may be considered the outstanding temperature feature of the season. March freezes were responsible for crop damage locally in western Colorado and from Texas to the Atlantic coast. April freezes damaged some fruit in Idaho and western Colorado on the 6th and in the Middle Atlantic States and Southeast during the third decade. Crop damage from record-low May temperatures in the Northeast was estimated at millions of dollars, far exceeding the total losses for both March and April. Many stations in the lower great Plains reported their warmest May on record for another temperature feature of the month.

The summer was unusually warm in the Great Plains with temperatures averaging 2° or more above normal in large areas from South Dakota southward through Texas. Above-normal temperatures were unusually persistent in the lower Great Plains, particularly Oklahoma and Texas, where temperatures remained almost continuously above normal except during a sharp, cool snap from August 19 through the 23d. In the upper Great Plains summer temperatures averaged above normal only because of an unusually hot June, as both July and August were relatively cool. The summer was also 2° or more warmer than normal along the California coast. Notable hot periods occurred in the northern Plains from June 8 to 13, and in the lower Great Plains and lower Mississippi Valley during the first half of August. During the latter period maximum temperatures at Shreveport, La., equaled or exceeded 100° on 15 consecutive days (Aug. 4-18), a new record there.

The summer was abnormally cool in the upper Great Lakes region and Northeast, and in most of the area west of the Rocky Mountains, particularly the Great Basin. In the Northeast June was about normal or a little above, while July and August were both unusually cool, particularly July which was 4° or more cooler than normal in some areas. The water temperature in Lake Erie at Buffalo, N. Y., averaged 66°, the lowest in 29 years of record. The year's highest temperature, 125°, was recorded at Cow Creek, Calif., on June 25.

Fall (September-October-November) was unusually warm in the Great Plains but was on the cool side in the East and Pacific Northwest. September average temperatures were above normal in the lower Great Plains and Far West and below in the northern Great Plains and East. This pattern was reversed in October except that departures were rather high in the middle Mississippi Basin. November temperatures averaged well below normal except in California and along the Canadian Border east of the Continental Divide where they were a few degrees above. Temperatures in Florida averaged below normal for each of the 3 months. In the Northeast September 1956 was among the coldest on record and in the Far Southwest it was one of the warmest, with Prescott, Ariz., reporting the highest average temperature (72.3°) since 1865. October temperatures were featured by extreme warmth in the mid-Mississippi Valley where Peoria, Ill., experienced its second warmest October in the past 101 years. November temperatures were featured by one of the earliest freezes on record in the Far Southwest during the first few days of the month, followed by the next few days with record-breaking heat in the same region when a late-season high of 96° for San Diego, Calif., was recorded on the 9th.

December was somewhat on the cool side in the central Great Basin and on the Pacific coast above Santa Maria, Calif., but abnormally warm elsewhere. The month was unusually warm in the East where monthly departures ranged up to 10° and a number of stations reported the warmest December since 1889 and a number of others reported new December highs.

PRECIPITATION. - - The year's precipitation was above normal only in the Pacific Northwest, the eastern Dakotas and central Minnesota, the Appalachian region, parts of Alabama, and in scattered northern sections of the area east of the Appalachians. Precipitation was below normal in the remainder of the country. It was less than 50 percent of normal in central and western Texas, western Kansas, eastern New Mexico and in some sections of the Far Southwest, and less than 75 percent in nearly all of the Far Southwest, the central and lower Great Plains, Iowa, northern portions of Missouri and Illinois, and some sections of the central Rocky Mountain region.

In a large area extending from Iowa and northern portions of Illinois and Missouri into the Far Southwest many stations recorded their least annual precipitation totals on record. Some of these stations with long-term records and their 1956 annual totals with departures from normal are listed below:

Chicago, Ill.	22.23 inches	-10.49 inches
Des Moines, Iowa	17.07 "	-13.82 "
Concordia, Kansas	13.73 "	-11.67 "
Dodge City, Kansas	9.97 "	-10.61 "
Tulsa, Okla.	23.24 "	-14.44 "
Amarillo, Tex.	9.94 "	-11.18 "
Dallas, Tex.	21.75 "	-12.67 "
Del Rio, Tex.	4.34 "	-14.24 "
Roswell, N. Mex.	4.35 "	-7.72 "
Phoenix, Ariz.	2.82 "	-4.34 "
Yuma, Ariz.	0.30 "	-3.09 "

In Florida, where the year was also exceptionally dry, Tampa and Key West reported their driest year on record, 28.89 and 20.46 inches, respectively.

Drought threatened in several other sections outside of Florida and the main drought areas in midcountry and the Far Southwest in the course of the year, but failed to become serious due to timely rains.

Record-breaking rains in southern California during January caused damaging floods in the Los Angeles area. Heavy precipitation fell in the Pacific Northwest during both January and February and during the latter month frequent rains from Kentucky and Tennessee eastward accumulated to 9.74 inches at Greenville, S. C., for its wettest February on record.

The spring season was extremely dry in central and south-central Texas, in an area extending from the central Great Plains through the Far Southwest and in some sections of the northern Great Basin area and the Pacific Northwest. March, dry over most of the country, was extremely dry from the middle Mississippi Basin westward. Sacramento, Calif., recorded its lowest March total, 0.03 inch, in the past 107 years. Mid-April rains of 2 to 4 inches brought much relief from the prolonged dry spell in the Florida Peninsula and generous rains in California during both April and May were very beneficial in that state. Rain was needed badly in the State of Washington by the end of May.

During the summer season rainfall was seriously deficient in most of the southwestern quarter of the country and generally ample to abundant in the North and East. June rains brought relief from the dry spell in the State of Washington. Both July and August were extremely rainy and cloudy in northern areas east of the Great Plains; totals for both months set new records at a number of stations, and at Buffalo, N. Y., not one clear day occurred during the entire month of July. A notable rainfall occurred at Unionville, Md., on July 4 when 1.23 inches was recorded in 1 minute (3:23 p.m. - 3:24 p.m.) or less, setting a new world's record for rainfall intensity. The degree of instrumental accuracy in measuring such high rates of rainfall has never been fully determined; still, the above record exceeds all others by a considerable margin.

The fall season was extremely dry from the lower Great Lakes to the Far Southwest, and precipitation was generally below normal elsewhere except along the north Pacific coast and east of the Appalachians. In the latter area totals generally exceeded 8 inches and ranged up to more than 20 inches in the east Gulf coastal area, the major portion of which fell during the passage of hurricane Flossy, September 24-28. Most of the north Pacific coastal rains fell in October although generous amounts also fell west of the Cascades in November.

During December the only significant above-normal amounts fell in the Appalachian region, the Northeast and a few other small widely scattered areas. At the end of the year, although surface moisture conditions had been replenished in the southeastern Great Plains, drought continued in most of the large area from the lower Great Lakes to the Far Southwest. Drought also persisted in Florida where December was the driest on record in some sections.

DROUGHT. - - The 1956 drought in the central and lower Great Plains and Far Southwest, measured on the basis of subnormal rainfall, was the culmination of a series of dry years (50 to 75 percent of normal rainfall) which began in parts of the Far Southwest in the 1940's and spread into the Great Plains in 1952, and into parts of Iowa and Missouri in 1953. In 1954 the drought was greatly intensified in the central and lower Great Plains during one of the hottest and driest summers on record there. At the end of another dry year in 1955 both in the central and lower Great Plains and Far Southwest, ground water had fallen to record-low levels and water supplies in streams, lakes and storage reservoirs had become extremely low.

The first 3 months of 1956 were unusually dry. Rains brought some relief to the eastern portions of the drought area in April and to scattered sections in May and June. July rains brought further relief to the eastern Great Plains and some relief to other sections of the drought area except Texas and southeastern New Mexico; but in all sections, even where generous rains fell, benefits were of short duration due to dry, powdery surface soil and high temperatures. Extremely dry weather in the drought area continued through August, September and most of October.

The disastrous effects of the drought continued to mount throughout the growing season. Dryland crops were a total failure in many sections of the southwestern Great Plains and crop production was reduced greatly throughout the drought area. Particularly serious was the failure of pasture and feed crops which forced liquidation of livestock. A large number of counties were declared disaster areas and received Federal Aid. Thousands of farmers were without means of livelihood and sought work in cities. Businessmen in small towns, a large part of their sales being to farmers, were also hit hard. Water supplies in several large cities became a serious problem.

General rains in late October and early November and again in mid-December in the southeastern Great Plains brought renewed hopes for fall crops although subsoil moisture remained low and more rain was badly needed there at the end of the year.

SNOWFALL. - - During 1956 snowfall in the Cascade Mountains was outstanding. In January, February and March heavy falls boosted depths to near or above previous records, and at Paradise Ranger Station, Wash., the seasonal fall (July 1955 - June 1956) of 1,000.3 inches set a new record for the United States. The previous seasonal record fall was 884 inches at Tamarack, Calif., in 1906-07. Snowfall during the first 3 months was also very heavy in the Sierra Nevada and central and northern Rocky Mountains. These heavy snows helped furnish adequate irrigation water during the growing season. Snowfall was very light in the Far West during the closing months of the year and the mountain pack was much below normal.

The year's snowfall was also heavy in New York and New England and occurred unusually late in the spring and unusually early in the fall. Many stations reported twice their average annual amounts. The highest annual total in this area was 211.4 inches at Boonville, N. Y.

Outstanding snowstorms during the year occurred in the southwestern Plains on February 1-3 and in the Northeast on March 16-19.

DESTRUCTIVE STORMS. - - January's most destructive storms occurred on the 8th when glaze covered a large area of the Northeast causing damage estimated at $1,000,000 in Pennsylvania alone. The worst snowstorm in 50 years in sections of the southwestern Plains on February 1-3 paralyzed transportation, damaged power and communication lines, caused some loss of livestock, and on the 24th and 25th high winds caused severe duststorms in the Great Plains and millions of dollars property damage in the Northeast. On March 16-17 New England's worst late-season snowstorm in a generation paralyzed transportation and caused some damage to power and communication lines. Another snowstorm in central and upper New England on April 7-8 was described as the worst April snowstorm there in 23 years.

An outbreak of tornadoes in central areas on April 7-8 caused heavy damage in parts of Kansas, Tennessee, Wisconsin and Michigan, and on the 15th a very severe tornado hit the outskirts of Birmingham, Ala. Another outbreak of these storms occurred in Ohio and Michigan on May 12. On October 29 tornadoes took a heavy toll of farm property in Kansas and Nebraska. Tornadoes were reported in New England on November 21-22 during the passage of a cold front. In December these storms caused some damage in Missouri and Kansas on the 4th and additional damage estimated at many thousands of dollars in Alabama and Georgia during the night of the 22d-23d.

During the summer months numerous thunderstorms with damaging wind and hail occurred in the northcentral border region.

A glaze storm, one of the most destructive storms of the entire year, caused damage in Macoupin, Madison and Jersey Counties, Illinois, estimated at $50,000,000 on December 8, the worst such storm in west-central Illinois since 1924. In southern California high winds on December 24 - 28 were blamed for spreading brush fires which were responsible for losses estimated at many millions of dollars.

Flossy, the year's only hurricane to enter the United States mainland, on September 24-28, followed a path from the southeastern tip of Louisiana to extreme southeastern Virginia causing several millions of dollars damage; but she also brought beneficial moisture to a wide belt extending from the Gulf to southern New England. (From Climatological Data. National Summary, Annual 1956, Vol. 7. No. 13.

The maps on pages 106, 107, 108, 109, show the temperature and precipitation for the winter 1955-56, spring, summer and fall, of 1956.

GENERAL

K. Maramorosch collated and summarized the information accrued during the past 20 years concerning the transmission of plant viruses by insect vectors, the mechanism of their multiplication in the vector, in which they must be regarded as parasites, and the bearing of this upon the relationship between animal and plant viruses. (Bull. Torrey Bot. Club 83(3): 234-237).

Carlton F. Taylor described a device which records with high accuracy the starting time and the duration of dew deposits. Dew deposition on it is comparable to that on foliage under similar placement. This instrument has proved to be dependable and rugged under field conditions. Knowledge of the period during which dew is present on plants is of prime importance in studies on the epiphytology of plant diseases (PDR 40: 1025).

R. D. Schein and others have given directions for construction of a portable thermistor-equipped psychrometer, suitable for use in field study of atmospheric temperature and moisture in relation to disease development (PDR 40: 929).

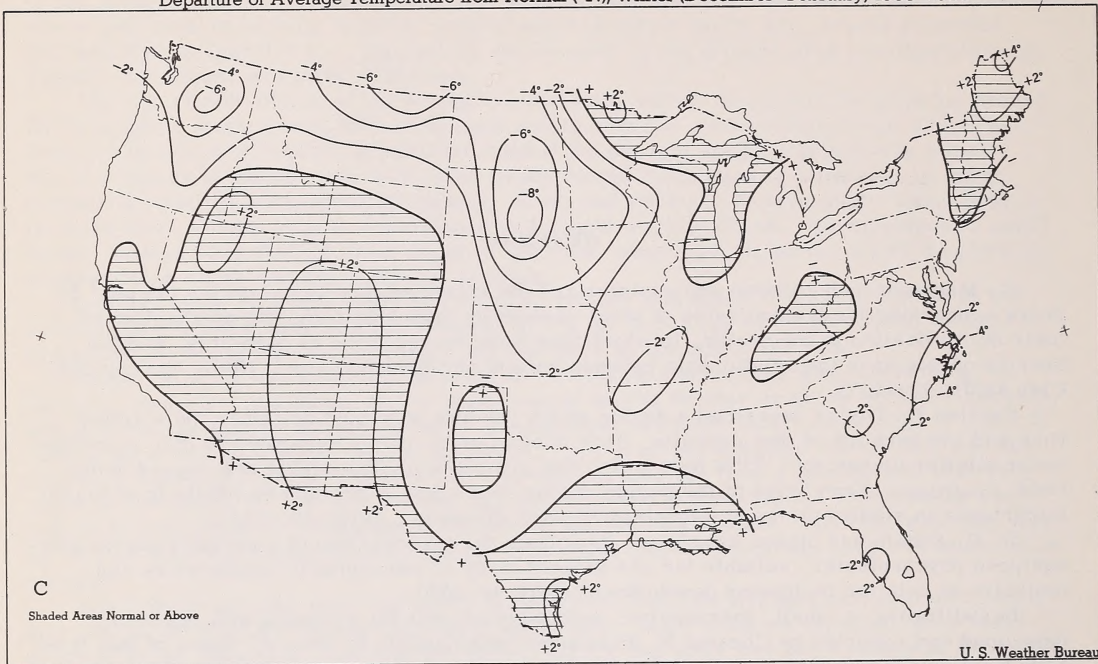
In California, a small, inexpensive, multipurpose unit for steaming soil has been developed and reported by Chester N. Roistacher and Kenneth F. Baker. Units of this type have been extensively and satisfactorily used over a 7-year period to free soil of a wide range of fungi, bacteria, nematodes and viruses (Phytopath. 46: 329).

In Ohio, Wm. Bridge Cooke reported fungi of interest to the plant pathologist isolated from polluted water and sewage. He pointed out that in these days of increased supplemental irrigation by use of sewage or polluted water the plant pathologist is presented with additional problems of disease control. Unfortunately, to control one fungus chemically may inhibit the work of many beneficial organisms, so that control measures necessary for irrigation waters should be applied to effluents rather than to influents of the sewage treatment plant. Adequate control of plant pathogens may also result in adequate control of human pathogens, so that a wider use could be made of sewage effluents than is being made today. (PDR 40: 681).

P. L. Leyendecker and R. M. Nakayama in reporting the 1956 plant disease summary for New Mexico stated that drought was responsible for reduced prevalence of diseases in that State (PDR 41: 53).

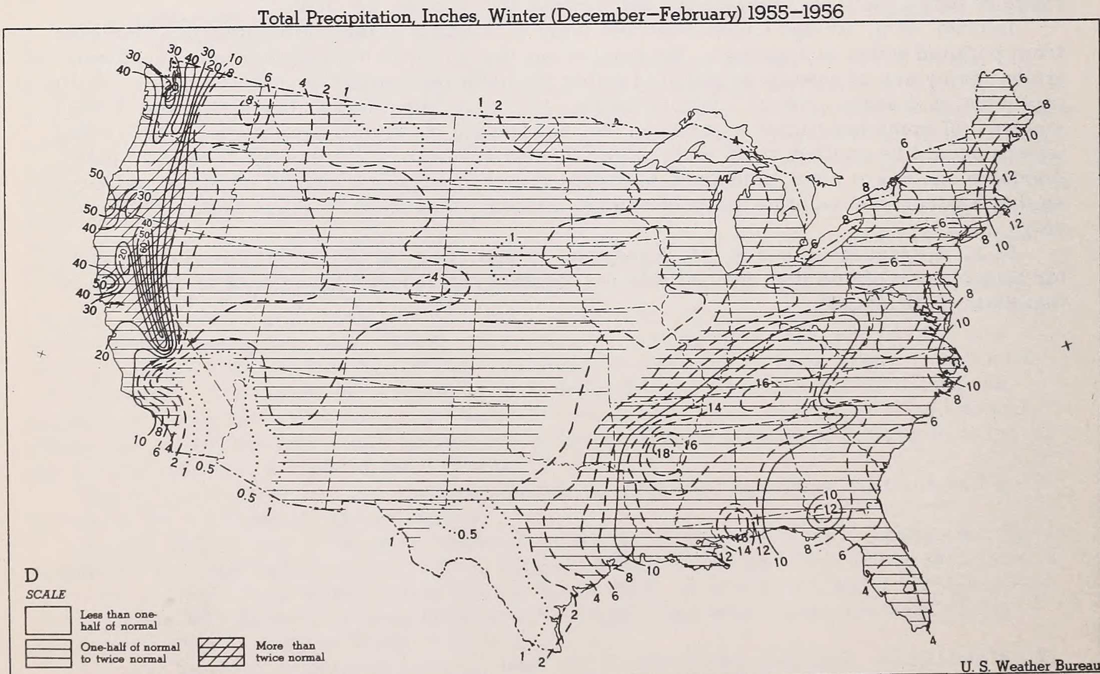
TEMPERATURE AND PRECIPITATION

Departure of Average Temperature from Normal (°F.), Winter (December–February) 1955–1956



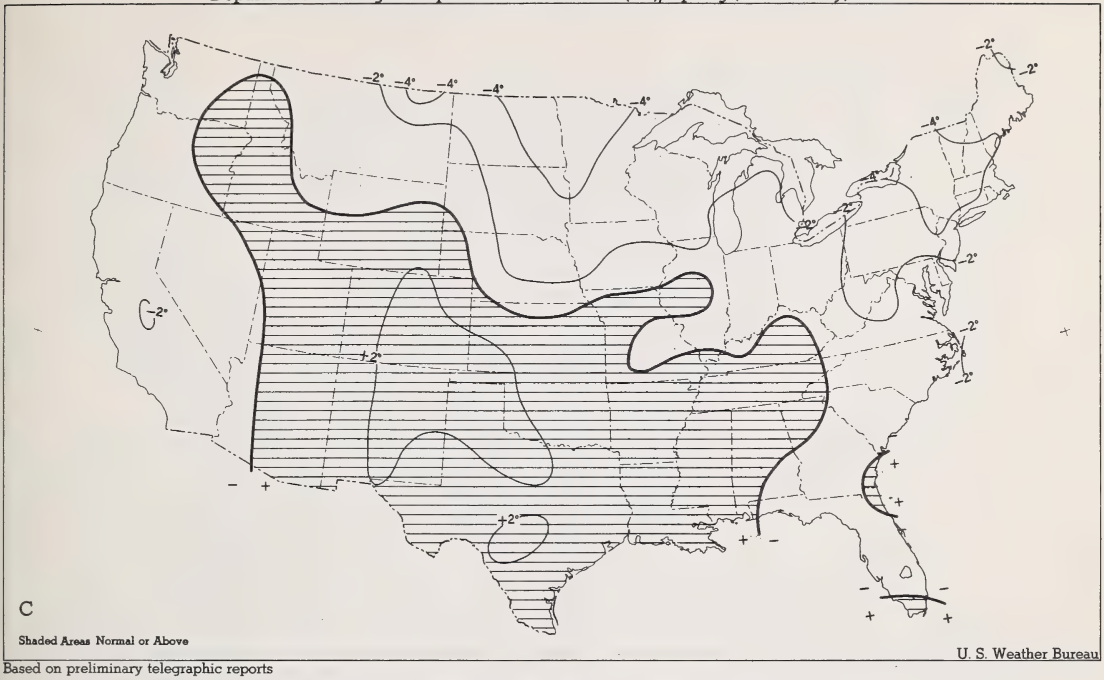
Based on preliminary telegraphic reports

Total Precipitation, Inches, Winter (December–February) 1955–1956



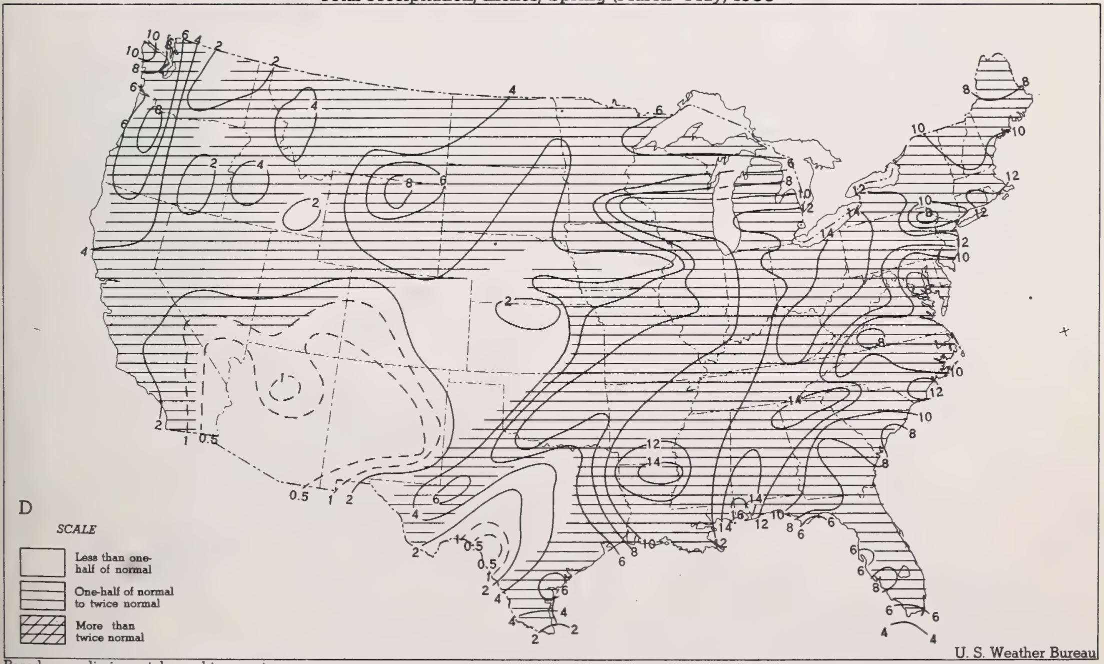
Based on preliminary telegraphic reports

Departure of Average Temperature from Normal (°F.), Spring (March–May) 1956



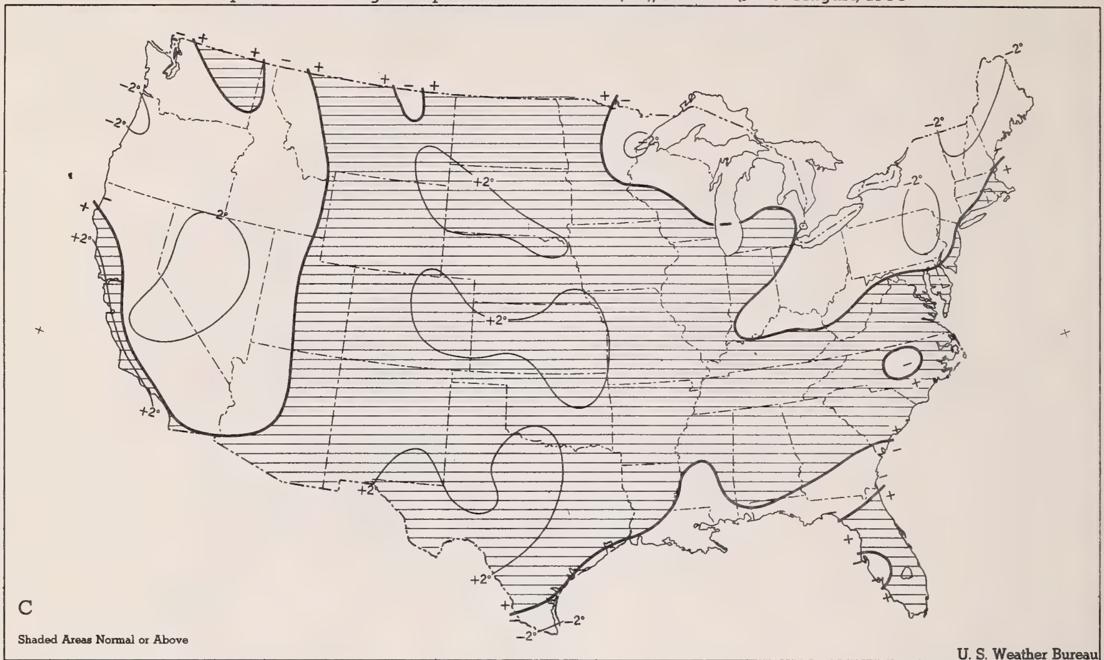
Based on preliminary telegraphic reports

Total Precipitation, Inches, Spring (March–May) 1956



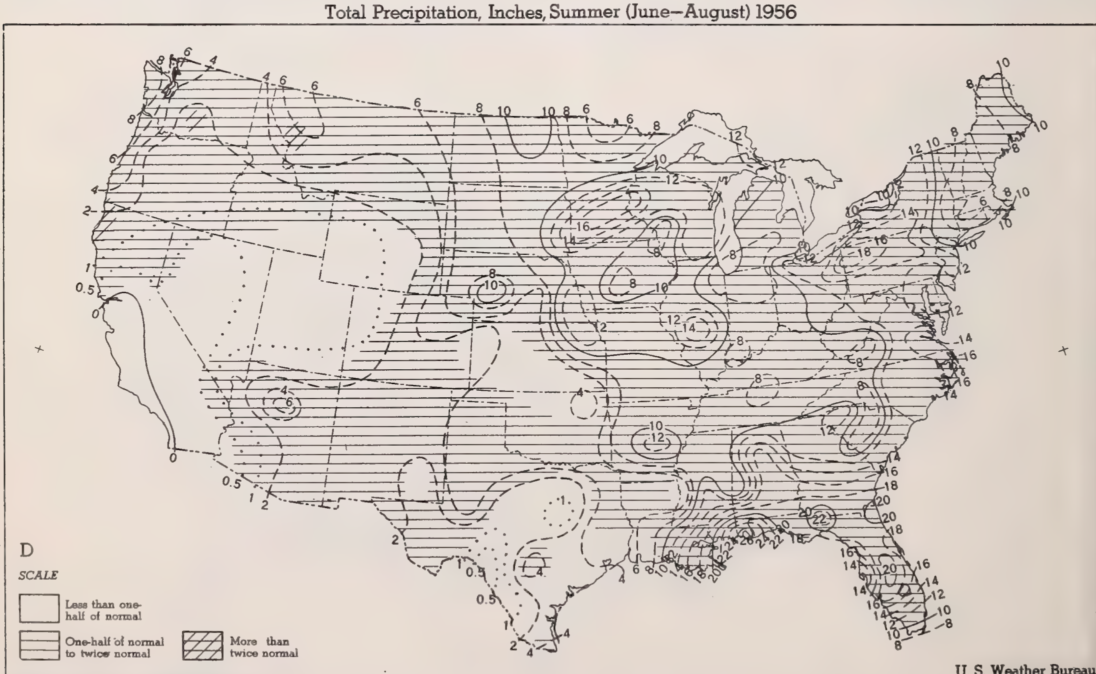
Based on preliminary telegraphic reports

Departure of Average Temperature from Normal (°F.), Summer (June–August) 1956



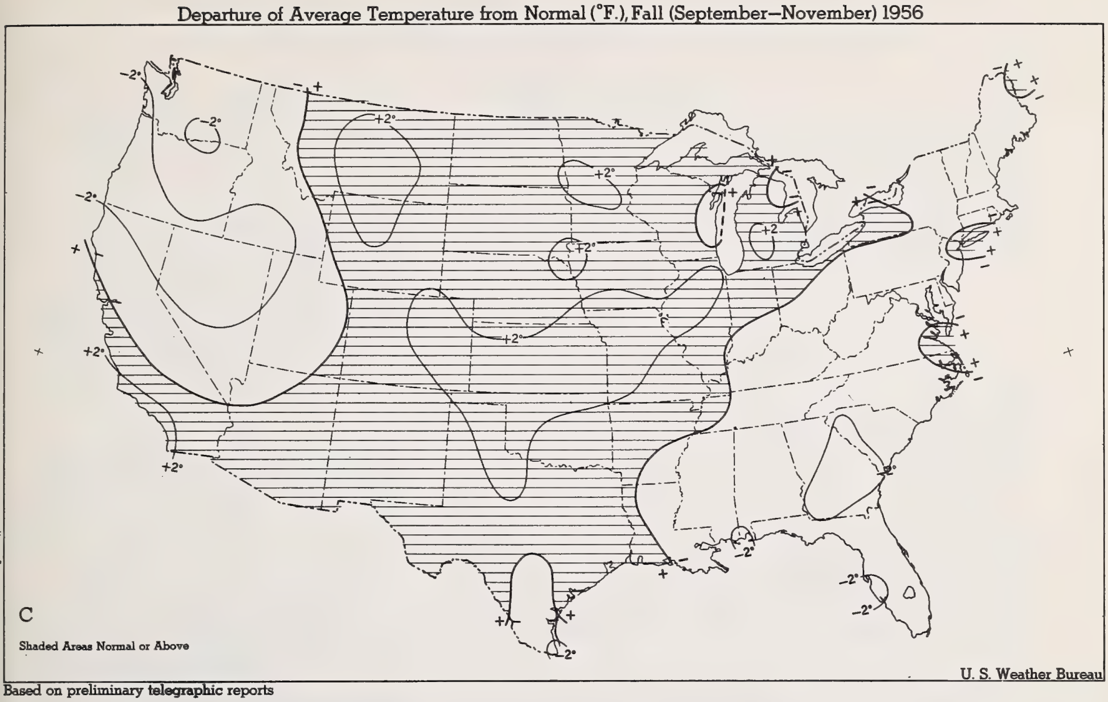
Based on preliminary telegraphic reports

Total Precipitation, Inches, Summer (June–August) 1956



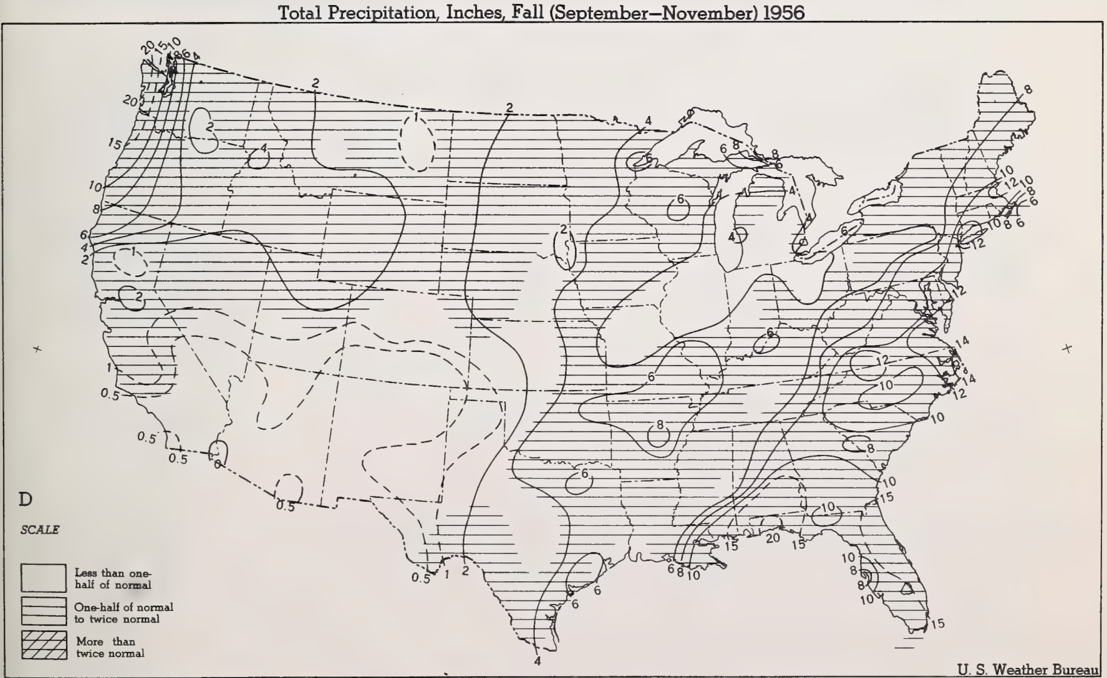
Based on preliminary telegraphic reports

Departure of Average Temperature from Normal (°F.), Fall (September–November) 1956



Based on preliminary telegraphic reports

Total Precipitation, Inches, Fall (September–November) 1956



Based on preliminary telegraphic reports

(From Weekly Weather and Crop Bulletin National Summary, Volume 43, 1956)

Table 1. Diseases reported in States where they had not been found or reported on a particular host until 1956.

Host Disease (Cause)	Where found	Remarks
CORN (ZEA MAYS) Sting nematode (*Belonolaimus gracilis*)	New Jersey	Previously published records of this nematode have indicated that it did not occur north of Virginia, except for one occurrence in a greenhouse in Connecticut (PDR 40: 1049).
CORN (ZEA MAYS) Witchweed (*Striga* sp.)	South Carolina	Found adjacent to the affected portion of North Carolina (PDR 41: 133).
WHEAT (TRITICUM AESTIVUM) Leaf stripe (*Cephalosporium gramineum*)	New York	The pathogen has been observed in all of the important soft white winter wheat growing counties of central and western New York (PDR 41: 384).
CAMELLIA spp. Flower blight (*Sclerotinia camelliae*)	South Carolina	The disease has been found in three counties, Sumter, Dorchester and Florence (PDR 40: 831).
SMARTWEED (POLYGONUM PUNCTATUM) *Ustilago utriculosa*	Pennsylvania	Dotted smartweed seed is an important waterfowl food. All the ovaries of the spike were killed and the tissue was replaced by fungus spores (PDR 40: 1017).

Table 2. Diseases found or reported in this country for the first time in 1956=*; diseases found on new hosts=**, [1, 2, 3, 4].

ZEA MAYS (CORN)		
Witchweed Striga sp.	North Carolina	Found in several fields in Columbus and Robeson Counties. First report in the Western Hemisphere. Associated with poor growth and dying of corn (PDR 40: 837).
ALFALFA (MEDICAGO SATIVA)		
Bacterial leaf spot* (Xanthomonas alfalfae)	Iowa	The disease occurred chiefly on a clonal selection from Cossack alfalfa, which was seriously infected (PDR 40: 830).
ALTA FESCUE (FESTUCA ELATIOR var. ARUNDINACEA)		
Crazy top** (Sclerophthora macrospora)	Indiana	The infected plants were found in a low wet part of the field (PDR 40: 830).
BERMUDA GRASS (CYNODON DACTYLON)		
Leaf spot (Helminthosporium stenospilum)	Florida	A new disease on this host, symptoms described (PDR 41: 389).
BLUEGRASS (POA spp.)		
Stripe rust** (Puccinia striiformis)	California	Reaction of species of Poa and other grasses to this rust. 1st rept. on this host (PDR 40: 644).
BLUE LUPIN (LUPINUS ANGUSTIFOLIUS)		
Gray leaf spot**) (Stemphylium solani)	Florida Georgia	Observed near Albany in 1956 and later in other localities in Georgia, and at Gainesville and Quincy, Florida (PDR 40: 803).
Little leaf spot** (Stemphylium botryosum)	Florida Georgia	Reported and described as a hitherto unrecognized disease of blue lupines in the United States (PDR 40: 803).

[1] Birchfield, Wray. New and suspected host plants of the burrowing nematode, Radopholus similis (Cobb) Thorne. PDR 40: 866. Thirty-one plants are reported as new hosts. Twenty-four additional plants are indicated as suspected hosts. In all 36 plant families are represented.
[2] Hardison, J. R. and J. P. Meiners. New host records for dwarf bunt in the Pacific Northwest. PDR 40: 1058.
[3] Feder, William A. and Julius Feldmesser. Additions to the host list of Radopholus similis, the burrowing nematode. PDR 41: 33. The hosts include many tropical and subtropical weeds and ornamental plants grown in Florida.
[4] Ellett, C. W., Diseases not previously reported in Ohio. (PDR 41: 369). The records are based upon collections and identifications of the author for the most part.

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
LADINO WHITE CLOVER (TRIFOLIUM REPENS var. LADINO) Stemphylium trifolii** J. H. Graham	Pennsylvania	A previously unreported disease on this host has been observed in central Pennsylvania for 3 years. The disease has been described as a new species and the name Stemphylium trifolii was proposed (Phytopath. 47: 13).
SWITCHGRASS (PANICUM VIRGATUM) Panicum mosaic (Panicum mosaic virus)	Kansas	A new virus disease due to a new manually-transmissible virus. A potentially serious disease (PDR 41: 241).
WHITE CLOVER (TRIFOLIUM REPENS) Bacterial leaf spot ** (Pseudomonas stizolobii)	New York	During the summer of 1954 numerous areas were observed in the lawn of the Cornell University campus where the leaves of white clover were spotted and dying. An occasional plant was found in 1955 (Phytopath. 47: 48).
ADDER'S-TONGUE FERN (OPHIOGLOSSUM VULGATUM) Blight* ** (Curvularia crepini)	Ohio	Diseased plants were found frequently during May and June 1956 in University woods, Franklin County. This is the first report of this fungus in North America and apparently the first report of any disease on the host in this country (PDR 40: 756).
ENGLISH HOLLY (ILEX AQUIFOLIUM) Leaf and twig disease (Phytophthora ilicis n. sp.) I. W. Buddenhagen and R. A. Young	Oregon Washington	Previously ascribed to two different organisms, Boydia insculpta and Phomopsis crustosa. The disease developed during cool moist periods (Phytopath. 47: 95).
GOMPHRENA GLOBOSA Tomato ringspot virus**	Maryland	It was found that the tomato ringspot virus produced symptoms on G. globosa while using it as an index for detection of hydrangea viruses (PDR 40: 667).

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
GREENE'S BUR-REED (SPARGANIUM GREENEI) Radopholus gracilis* **	California	Soil from around the roots of this plant had a light population of this nematode together with various other forms (PDR 41: 91).
ICELAND POPPY (PAPAVER NUDICAULE) Powdery mildew** (Erysiphe polygoni)	California	In the summer of 1956 a planting of Iceland poppy on the Berkeley campus of the University of California was found to be heavily infected with the conidial stage of a powdery mildew. As the season progressed, the perithecial stage of the fungus was produced in abundance on the infected leaves (PDR 41: 694).
SYRINGA VULGARIS (LILAC) VITIS VINIFERA var. EMPEROR (GRAPE) Citrus nematode** (Tylenchulus semipenetrans)	California	Found on the Citrus Experiment Station, Riverside (PDR 40: 1047).
PEPPERMINT (MENTHA PIPERITA) (Sclerotinia sclerotiorum)**	Washington	Extremely heavy mint growth favored the development of Sclerotinia. Abundant formation of sclerotia was found in the stem (PDR 41: 493).
CANISTEL TREE (POUTERIA CAMPECHIANA) Scab** (Elsinoë lepagei)	Florida	Found on small trees in cans in a nursery at Hialeah, Florida (PDR 41: 540).
COTINUS COGGYGRIA (SMOKE-TREE) Rust**	Georgia	First observation and collections of a rust new to North America on this host were made on June 25, 1956 (PDR 40: 1015).

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
FEIJOA SELLOWIANA Sphaceloma psidii*	Florida	Found on leaves in April 1956. First rept. in this country (PDR 40: 655).
LEUCOTHOE POPULIFOLIA Elsinoë ledi**	Florida	Found on leaves in January 1956 (PDR 40: 655).
TERNSTROEMIA GYMNANTHERA Elsinoë leucospila**	Florida	Found on leaves in March 1956 (PDR 40: 655).
BEAN (PHASEOLUS VULGARIS) Bean wilt Corynebacterium flaccumfaciens var. aurantiacum n. var.)	Nebraska	Presence of an orange-colored bacterium under the seed coat of beans was manifested by a similar coloration of the seed (Phytopath. 47: 51).
BEAN (PHASEOLUS VULGARIS) Victoria blight** (Helminthosporium victoriae)	North Carolina	The disease was observed in the field only when beans were grown adjacent to fields of oats heavily infected with the disease (Phytopath. 46: 229).
CARROT (DAUCUS CAROTA) Motley dwarf* (Virus)	California	Found in several areas. In a seed field crop at Davis less than 50 percent of plants were infected. As the insect vector Cavariella aegopodii was present the disease continued to spread. This disease previously known to occur only in Australia (PDR 40: 763).
PEPPER (CAPSICUM FRUTESCENS) Powdery mildew (Erysiphe cichoracearum)	Florida	Observed in spring of 1955 on small planting of pepper. At about the same time in 1956 it was again found on the same farm and also on several adjacent farms. First outbreak on pepper in U. S. (PDR 40: 756).

DISEASES OF CEREAL CROPS

R. A. Cappellini and S. Lund reported diseases of small grains observed in New Jersey in the 1955-56 season. Grain yields were relatively high and disease losses low. (PDR 41: 117).

M. C. Futrell and I. M. Atkins reported trends in diseases of cereal crops in Texas in recent years. They included some diseases not previously observed in the area (PDR 41: 42).

In Utah M. Treshow reported evidence that suggested occurrence of terminal bleach of cereals may be associated with sudden advent of hot dry weather accompanied by high winds (PDR 41: 118).

H. H. McKinney concludes that protection and synergy tests with cereal mosaic viruses aid in determining relationships between viruses (PDR 40: 898).

H. H. McKinney reported that Atsel barley is an effective test plant for wheat streak mosaic virus but not for brome grass mosaic or barley stripe-mosaic viruses (PDR 40: 1102).

R. W. Leukel and R. W. Earhart reported results of seed treatment tests for control of oat smuts and wheat bunt (PDR 40: 785).

AVENA SATIVA. OATS: Erysiphe graminis avenae, powdery mildew. H. R. Rosen reported that 1956 marks the first epidemic of powdery mildew ever observed on oats in the field in Arkansas. Among the well known varieties Victorgrain 48-93 and the Red Rustproof strains showed a high degree of resistance, as did numerous breeding numbers. Similar epidemics also occurred on barley and wheat (PDR 41: 330).

Helminthosporium avenae, leaf blotch, according to H. H. Luke and others, is generally considered as a minor disease but it occurred in epiphytotic proportions throughout Florida and south Georgia during the spring of 1956. A black stem symptom not previously associated with the organism was reported (PDR 41: 69).

Helminthosporium victoriae, Helminthosporium blight. In New York, R. B. Pringle and A. C. Braun reported the isolation of the toxin of H. victoriae. The purified toxin shows the same specificity as does the causal fungus and produces symptoms in susceptible oat plants that are indistinguishable from those produced by the fungus (Phytopath. 47: 369). Experiments at State College, Texas, during 1956, resulted in the discovery of an improved technique for inoculating oat plants in their seedling stage to determine reaction to H. victoriae, according to G. W. Rivers and others (Jour. Agron. 48 (9): 428).

Leptosphaeria avenaria, black stem and leaf blotch phases of Septoria. R. L. Kiesling and J. E. Grafius reported that 40 oat varieties were selected from a total of 5343 lines of the World Oat Collection for their resistance to this fungus under Michigan conditions. During 3 years of tests those selections retained resistance to natural infection, whereas the susceptible check became highly infected. The resistant varieties included a range of maturity dates and agronomic types. Resistance to stem and leaf blotch functioned independently in certain varieties. Some varieties showed slight difference in different years and parts of the State, but varietal reaction was mostly highly consistent (Phytopath. 46: 305).

Puccinia graminis and P. coronata var. avenae, stem rust and crown rust. S. M. Pady and C. O. Johnston reported that on oats stem rust was only a trace and crown rust was difficult to find, in Kansas (PDR 40: 1061).

Septoria avenae, speckled blotch. A. L. Hooker reported that the reactions of 257 oat varieties or selections to artificial inoculations with S. avenae were determined at Madison, Wisconsin in 1956. Several oat strains showed little disease while others were highly susceptible (PDR 41: 385).

HORDEUM VULGARE. BARLEY: Erysiphe graminis f. sp. hordei, powdery mildew. At the North Carolina Agricultural Experiment Station six new physiologic races of Erysiphe graminis, numbered 14 to 19, and nine reported previously were isolated from mildewed barley plants collected in Canada and the United States from 1950 to 1954. Most of the cultures were obtained from the southeastern United States where race 9 and 6 predominated; 3, 13, 18 were isolated in California, while the following were found in one State only: race 4 in Texas, 14 and 16 in Virginia, and 15 in North Carolina (J. G. Moseman, Phytopath. 46: 318).

Helminthosporium sativum, leaf blotch. The relation of temperature to disease development by H. sativum on barley was discussed by R. V. Clark and J. G. Dickson (Phytopath. 47: 6).

Puccinia graminis f. sp. tritici, stem rust. The seedling reactions of 52 barley varieties to 3 races of P. graminis f. sp. tritici were determined at temperatures of 16°, 20°, 24°, and 28° C during and following inoculation. A combination of number and type of pustules was the best measure of differences among varieties. Temperature influenced the frequency of pustules, pustule size, and reaction type. Differences among races were small. For most varieties and hybrids, there was close agreement between seedling reactions at 28° C and the adult-plant reactions in field or greenhouse. (F. L. Patterson, and others, Phytopath. 47: 395).

Richard D. Schein and J. W. Kerelo described an effective technique for isolating and growing Rhynchosporium secalis (PDR 40: 814).

Ustilago nuda, loose smut. According to I. N. Tandon and E. D. Hansing the anaerobic treatment was more satisfactory than the water-soak in controlling loose smut of barley because it controlled smut and only slightly reduced emergence (PDR 41: 202).

Mosaic (virus). Barley stripe mosaic has been recognized as a serious disease of barley, according to P. J. Fitzgerald and others. The nature of the disease suggests that it may be a potentially serious threat to winter wheat (PDR 41: 393). Evaluation of results so far obtained from the barley seed-testing program for stripe mosaic in Montana for two years, reported by H. S. MacWithey and others, suggested that it may not be possible to eliminate stripe mosaic entirely but that spread and increase of the virus may be reduced (PDR 41: 514).

LINUM USITATISSIMUM. FLAX: Colletotrichum linicola, anthracnose, occurs in most of the major flax-growing areas of the world. Its prevalence and destructiveness depend on extensive culture of a susceptible flax variety and on humid growing seasons, according to E. A. Schwinghamer. Except for Crystal, flax varieties grown commercially in the United States were unsatisfactory for differentiating pathogenic races. Six varieties were selected as differentials in a screening test of 650 entries of the world collection. By their use 42 monoconidial isolates of C. linicola were identified as 5 distinct pathogenic races. On the basis of minor differences, these races were further separable into subraces (Phytopath. 46: 300).

ORYZA SATIVA. RICE: Results of the uniform rice seed treatment tests in Arkansas, Louisiana, and Texas in 1955-1956 have been analyzed by J. G. Atkins and others (PDR 41: 105).

In 1956 several chelated compounds together with a soil amendment material called Feralum were applied to a straighthead-susceptible variety of rice grown under conditions favorable for disease development on sandy loam near Eagle Lake, Texas. No benefits from the chelated materials were noted, but highly significant yield differences obtained from Feralum were attributed to differences in severity of straighthead. (N. S. Evatt and J. G. Atkins, PDR 41: 103).

According to E. M. Cralley experiments were conducted during 1954-56 on the effects of seeding methods on the severity of the foliar nematode disease of rice known as white tip (Aphelenchoides oryzae). It was concluded that water seeding of rice offers a simple and practical method for the control of white tip. Since the organism is seed borne and not soil borne, it would not be necessary to seed in water every year in order to maintain satisfactory control of the disease (Phytopath. 47: 7).

SORGHUM spp. SORGHUM: C. H. Hsi reported that eighteen varieties of sorghum were tested for reaction to the phytotoxic action of a liquid mercury fungicide (Panogen 15) applied at several dosages to the seed (PDR 41: 312).

R. W. Leukel and others summarized the results of the 1956 seed-treatment tests for control of sorghum covered kernel smut (Sphacelotheca sorghi) (PDR 40: 1071). Preliminary studies with the complex F-17 for control of sorghum covered kernel smut was reported by R. W. Leukel and J. W. Mitchell. They concluded that a practical method of dusting seeds with F-17 for smut control could possibly be developed (PDR 40: 1073).

Sphacelotheca reiliana, head smut. Some factors that might contribute to the incidence of sorghum head smut in the Mid-West were discussed by R. W. Leukel (PDR 40: 737).

TRITICUM AESTIVUM. WHEAT: C. H. Hsi concluded that both stand reduction and seedling injury must be considered in studies on toxicity of mercurial seed disinfectants to wheat (PDR 40: 1065).

Puccinia spp. An unusual combination of circumstances in 1956 resulted in one of the lightest rust years ever experienced in Kansas, according to S. M. Pady and C. O. Johnston

(PDR 40: 1061).

A vacuum drying process for preservation of spores of Puccinia graminis was reported by D. M. Stewart in Minnesota. In all tests spores survived best in a mixture of hemin. Results of this preliminary study indicated that urediospores of P. graminis can be preserved longer when certain additives, especially hemin, are mixed with the spores prior to vacuum drying. It appeared that hemin may also stimulate spore germination (Phytopath. 46: 234).

Puccinia graminis f. sp. tritici, stem rust. Pre-infection applications of the semicarbazone of cycloheximide controlled black stem rust on a highly susceptible spring wheat variety; its effect persisted for a long period of time after application; and phytotoxicity was negligible since there was no adverse effect on yield or germination (R. G. Hacker and J. R. Vaughn. PDR 41: 442).

An automatic syringe "Vipol Vaccinator" for injecting liquids into plants was reported by C. W. Boothroyd. Wheat plants inoculated in the young boot stage with Puccinia graminis f. sp. tritici were heavily rusted about two weeks after inoculation. The technique might be used for inoculations with other pathogens as well as for the injection into plants of solutions or suspensions of such materials as dyes, pesticides, and radioactive substances (Phytopath. 47: 244).

Puccinia rubigo-vera (P. recondita), leaf rust. S. M. Pady and C. O. Johnston in Kansas reported that in general, the amount of rust was much less in 1956, both in the air and in the field, than in previous years, and 1956 was one of the lightest, and at the same time, one of the most unusual leaf rust years experienced in the State (PDR 40: 1061).

Tilletia spp., bunt. Laurence H. Purdy summarized results of the 1956 regional seed treatment tests for wheat smut control in the Pacific Northwest (PDR 40: 996).

Tilletia caries, bunt. At the University of California, F. P. Zscheile reported a search for chlamydospores in wheat seeds grown under conditions favorable to bunt. It was concluded that hidden chlamydospores do not occur frequently in either Baart or Baart 38 under any conditions studied to date, even though adjacent seeds in the head are bunted. Artificial inoculation of flowers or heads was ineffective in producing chlamydospores. No bunted plant was produced from any seed that showed no external evidence of chlamydospore sorus formation, even though the seed may have come from a bunted plant or bunted head. If chlamydospores were present within the seed, they were neither viable nor able to produce infection (Phytopath. 46: 182).

F. P. Zscheile and M. Anken reported limited development of Tilletia chlamydospores within wheat kernels (Phytopath. 46: 182).

Typhula spp., and associated Fusarium nivale, were severe on fall-seeded winter wheat in Douglas County, Washington, during the past winter. A combination of poor dry seeding conditions in the fall, a long winter with continuously deep snow, and some severe freezes in February resulted in almost complete elimination of the fall seedings in this county. (R. Sprague, PDR 40: 640).

Urocystis spp., and Ustilago spp., smuts. In Washington, Laurence H. Purdy summarized data showing that good control of smut was obtained with all four materials tested and that post-treatment storage caused little or no significant increase in the effectiveness of the fungicides. Furthermore, there was no differential effectiveness of the materials, whether the seed was stored in paper or cloth bags. (PDR 40: 878).

Urocystis agropyri, flag smut. In greenhouse tests, hexachlorobenzene applied as a seed treatment gave good control of flag smut, according to results reported by Laurence H. Purdy (PDR 41: 558).

In Montana, F. H. McNeal and M. M. Afanasiev reported barley stripe mosaic virus in different parts of the head in Rescue and Onas spring wheat (PDR 40: 407).

ZEA MAYS. CORN: Data on the value of corn cold testing were obtained at Madison, Wisconsin, in 1956. Paul E. Hoppe showed evidence that cold testing and retreatment of old corn seed are definitely advantageous (PDR 40: 887).

In Ohio, L. E. Williams and S. K. Menon described their cork borer technique for inoculating corn plants with stalk-rot organisms. This method was selected for large-scale field inoculations because of the ease of preparation of inoculum and rapidity of procedures (PDR 41: 111).

A. L. Hooker reported association of resistance to several seedling, root, stalk, and ear diseases in corn. The disease reactions of 25 dent corn inbred lines to artificial inoculations that resulted in basal stalk rot caused by Diplodia zeae, by Gibberella zeae, and by both D. zeae and G. zeae were measured in 1953 and 1954. Seedling reactions to artificial inoculations with Pythium debaryanum, with P. graminicola, with D. zeae, and with G. zeae were determined in the greenhouse. Differences among corn strains in all evaluations were statistically significant (Phytopath. 46: 379).

Diplodia zeae and Gibberella zeae, stalk rots, were consistently determined to be the most prevalent and important causes of corn stalk rot in Illinois during the period 1945-56 (B. Koehler and G. H. Boewe, PDR 41: 501).

In the 1956 surveys in Minnesota, stalk rots were found to be the most important corn diseases and Gibberella spp. and Fusarium spp. the most important stalk rot pathogens, according to J. E. DeVay and others (PDR 41: 505).

Helminthosporium spp. A. J. Ullstrup and S. R. Miles reported the effects on grain yields of artificially induced epiphytotics of northern corn leaf blight, H. turcicum, southern corn leaf blight, H. maydis, and Helminthosporium leaf spot, H. carbonum, in the field. The severity of the 3 diseases appeared to be determined not by the primary infection induced by artificial inoculation but rather by the development of secondary infection, which was influenced by weather conditions. Early onset of the northern corn leaf blight, 2 to 3 weeks after silking, may be expected to cause severe losses in grain yield. If the disease does not become conspicuous until mid-September or 6 to 8 weeks after silking, no appreciable reduction in yield is apt to occur. With southern corn leaf blight, the same general trends were observed (Phytopath. 47: 331).

Striga asiatica, a flowering plant (witchweed), causes severe damage to the roots of many species of cultivated and wild grasses in tropical and subtropical countries of the Eastern Hemisphere. Its recent discovery on corn in North Carolina is the first known report of its presence in the Western Hemisphere. The parasite was found on corn and crabgrass in widely scattered areas in 4 counties in southeastern North Carolina and in several adjoining counties in South Carolina. Studies indicate that the parasite attacks a variety of economic and wild hosts that occur commonly in the sandy soils of the Coastal Plain. Striga seed germinated when kept in the presence of corn roots or in corn root leachates. Seed also germinated in the absence of host stimuli when subjected to either scarification or alternate freezing and thawing (R. R. Nelson and H. R. Garriss, Phytopath. 47: 313). R. R. Nelson summarized results of preliminary studies on S. asiatica found in corn fields in North and South Carolina, including host range, factors affecting development and parasitism, and control (PDR 41: 377).

ZEA MAYS var. SACCHARATA. SWEET CORN: Bacterium stewartii, bacterial wilt. In Michigan, L. E. Williams and J. L. Lockwood reported that 4 antibiotics and 9 surface-active agents were tested for control of bacterial wilt of sweet corn seedlings in the greenhouse. Wilt control was increased by placing plants in a moist chamber for 24 hours after spraying with streptomycin or Terramycin (Phytopath. 47: 44).

Helminthosporium maydis, leaf blight, was reported by Alice L. Robert to be the cause of the blackening of the silks of sweet corn ears in Florida. This symptom had not previously been associated with this pathogen (PDR 40: 991).

DISEASES OF FRUIT CROPS

W. F. Mai and others reported nematode genera found in New York State orchards (PDR 41: 402).

CITRUS spp. CITRUS: Lemon tree collapse as related to sodium in roots was reported by D. R. Rodney and others. They concluded that a high sodium content was the result and not the cause of this condition (Calif. Citrogr. 41: 313).

J. F. L. Childs reported a new disease of citrus trees in Florida in four widely separated locations. The disease has been found attacking the below-ground parts of 2- to 5-year old citrus trees on well drained sandy land recently cleared of turkey oak (Quercus laevis). The disease is characterized by the formation of soil and mycelium incrustations up to 1/4 inch thick and of rhizomorphs on the below-ground parts of the citrus trees and on oak roots occasionally found in contact with them (Phytopath. 47: 6).

L. J. Klotz and others reported leaf drop and copper spray damage to citrus. During the 1955-56 season copper damage caused considerable defoliation of citrus in some parts of

California. Bordeaux and other copper sprays cause damage by release of an excess of soluble copper, and also by increasing transpiration and thus accelerating wilting. Reduction of photosynthesis in dull weather results in the accumulation of carbon dioxide, which in turn causes an increase of soluble copper, and this damages leaf surfaces moistened by dew or fog with no run off, the effect being increased with low temperatures and inadequate soil moisture (Calif. Citrogr. 41: 147, 188, 1956).

Russet of citrus fruits, long combatted by sulfur on the theory that it was caused by the russet mite Phyllocoptruta oleivora, was controlled effectively in Florida by a single application of zineb during July and August, according to Fran. E. Fisher. Zineb depressed the population of rust mites, but some evidence suggested that the cause of the russet may not be mites but a fungus, possibly Cladosporium brunneo-atrum (Phytopath. 47 433).

F. E. Fisher reported results of Florida tests to determine effectiveness of non-copper-containing fungicides for control of anthracnose (Colletotrichum gloeosporioides) on rough lemon seedlings (PDR 41: 77).

Harry W. Ford reported that a total of 133 chemicals were screened for systemic effects against spreading decline (Radopholus similis). So far none has shown promise (PDR 40: 861).

R. C. Baines and others reported results of trials of various methods of applying Vapam for the control of the citrus nematode (Tylenchulus semipenetrans) and brown rot (Phytophthora spp.) in California (PDR 41: 405).

Tristeza (virus), mild and severe strains were reported in Texas citrus by Edward O. Olson (Phytopath. 46: 336).

Chronic decline, a bud-union disorder of sweet orange trees on sour orange rootstock, causes trees to decline in various degrees, according to Henry Schneider. The disease has been discovered as a result of intensive research on tristeza disease. Tristeza is caused by an aphid-transmitted virus. In both tristeza and chronic decline, a necrosis of sieve tubes occurs below the bud union, and the resulting girdling causes trees to deteriorate. In most trees additional anatomical abnormalities that are distinctly different from those of tristeza accompany the necrosis. A positive correlation was found between the amount of functioning phloem and the amount of starch in roots (Phytopath. 47: 279).

H. Schneider also reported a new disease of Eureka lemon trees on sweet orange root stocks, characterized by extensive necrosis of the sieve-tubes of the stock. Affected trees were stunted, new growth suppressed, the foliage yellow, and the branches partly defoliated. This disease may be of importance as sweet orange is the most successful citrus rootstock for lemons (Calif. Citrogr. 41: 387).

Flying aphid populations in southern California citrus groves and their relation to the transmission of the tristeza virus was reported by R. C. Dickson and others. Populations of flying aphids in southern California citrus groves from 1951 to 1954 were determined by trapping with sticky boards. The green citrus or spirea aphid, Aphis spiraecola, made up about 85 percent of the catch. The melon or cotton aphid, Aphis gossypii, constituted only 3 percent of the catch, but the 35,000 of these aphids recorded as flying to each citrus tree each year in the area of the most rapid spread of the tristeza (quick decline) virus were more than enough to account for the spread even though the transfer of an average of 5600 melon aphids was required to produce each infection in the experimental work. The spread of tristeza in the groves seldom exceeded the rate of 2 new infections each year from each diseased tree present. The tristeza virus was shown to be nonpersistent in its vector and to be carried only by the melon aphid in this area (Phytopath. 46: 204). In Florida, T. J. Grant and R. P. Higgins reported occurrence of mixtures of tristeza virus strains in Citrus (Phytopath. 47: 272).

FRAGARIA spp. STRAWBERRY: Botrytis cinerea, gray mold. P. M. Miller and E. M. Stoddard reported that in field trials, three applications of thiram, dichlone, or captan, starting at bloom and spaced 10 to 14 days apart, reduced the number of berries affected by gray mold. Thiram and dichlone reduced the number of affected berries to less than one-third that of the control, while captan plots had two-thirds as many as the control.. Dichlone and thiram gave about equal control, and both showed long residual action (PDR 40: 788).

Botrytis and Rhizopus rots. In New Jersey, G. H. DiMarco and B. H. Davis tested several chemicals for effectiveness as post-harvest treatments to prevent decay of strawberries (PDR 41: 496).

In California, Idriella lunata was found to be pathogenic to strawberry. The fungus caused rootlet degeneration and tip killing of the large adventitious roots. Under field conditions, I. lunata has been isolated only from roots of strawberry plants in areas where root deterioration was extensive. Under greenhouse conditions the fungus did not cause pre-emergence or post-emergence damping-off of strawberry seedlings. Under conditions favorable for the development of strawberry leaf spot caused by Mycosphaerella fragariae, I. lunata did not attack the foliage of strawberry (Paul E. Nelson, Phytopath. 47: 438).

Phytophthora fragariae, red stele. A method for the propagation of strawberry stocks which ensures the elimination of P. fragariae has been used successfully at the Oregon Agricultural Experiment Station. It is based on the established principles that the fungus does not invade the crowns or stolons even of susceptible varieties, that it grows poorly at soil temperatures above 65° F, and that it does not flourish in well-drained soil (E. K. Vaughan, Phytopath. 46: 235).

Pratylenchus penetrans, root lesion nematode. Observations reported by D. J. Raski indicated that P. penetrans was only one of the factors associated with black root rot in a California strawberry planting (PDR 40: 690).

Sphaerotheca macularis, powdery mildew. The relative resistance of some strawberry varieties and selections to powdery mildew at Corvallis, Oregon was reported by P. W. Miller and G. F. Waldo (PDR 41: 23).

Stephen Wilhelm reported that chloropicrin gave promising control of Verticillium wilt (Verticillium albo-atrum) of strawberry. Small-scale and commercial field-machine-applied tests at 480 pounds per acre achieved outstanding control of wilt and gave exceptionally vigorous plants. The control effect lasted through 2 years. Reinvasion of the fumigated soil by Pythium ultimum with attendant killing of feeder rootlets appeared to be a primary factor causing decline in plant vigor in fumigated fields (Phytopath. 47: 37).

Viruses. R. S. Bringhurst and Victor Voth in California reported that strawberry viruses are readily transmitted by cleft grafting excised terminal leaflets from test plants in place of the terminal leaflets of indicator plants. Successful graft unions can be quickly detected and virus symptoms develop in from 2 to 5 weeks on alpine vesca. Leaves can be collected from the field and grafted immediately or stored in polyethylene for a month or more at 36° F before grafting (PDR 40: 596).

MALUS SYLVESTRIS. APPLE: Gymnosporangium juniperi-virginianae, cedar apple rust, see under Venturia inaequalis.

Nectria galligena, European canker, has caused considerable damage to apple trees in Sonoma County, California in the past 2 years, according to C. W. Nichols and E. E. Wilson (PDR 40: 952).

Neofabraea malicorticis or N. perennans, bull's-eye rot, often causes serious losses on apple and pear fruits in cold storage, according to J. R. Kienholz. The study of weather relations and latent infection has led to more effective control of this disease in the Pacific Northwest (PDR 40: 872).

Physalospora obtusa, frog-eye leaf spot, appeared more widely in Connecticut in May and June of 1956. P. M. Miller recommended use of aluminum foil to increase success of inoculation in studies with the fungus (PDR 40: 1117).

Venturia inaequalis, scab. P. W. Miller described experimental methods for testing effectiveness of apple scab control under conditions favoring severe infection (PDR 40: 1118). J. M. Hamilton and Michael Szkolnik in New York reported the performance of Omadine, AC 5223, and other promising fungicides in the control of apple scab and cedar-apple rust (Gymnosporangium juniperi-virginianae) (PDR 41: 293).

Stem pitting. In Missouri, H. W. Guengerich and D. F. Millikan reported that the stem pitting factor has been experimentally transmitted by buds and bits of bark from pitted to non-pitted apple trees. This confirms the virus nature of this disorder, suggested previously in transmission studies involving hosts other than apple (PDR 40: 934).

PRUNUS spp. At the New York Agricultural Experiment Station, six Prunus species were compared as indexing hosts for stone fruit viruses by budding with 126 individual isolates, each containing one or more viruses (R. M. Gilmer and K. D. Brase, PDR 40: 767).

PRUNUS spp. CHERRY: Lambert mottle (virus). M. M. Afanasiev and I. K. Mills reported observations on the spread of Lambert mottle in Lambert and Peerless varieties of sweet cherries in Montana (PDR 41: 517).

Twisted leaf virus. E. L. Reeves and P. W. Cheney reported a new form of the twisted leaf virus of cherries, found on an old Lambert tree in Stevens County, Washington, producing a variety of symptoms on a number of cherry varieties that are unaffected, or only mildly affected, by the normal form (Phytopath. 46: 639).

PRUNUS AVIUM. MAZZARD CHERRY: Agrobacterium tumefaciens, crown gall. Ira W. Deep reported the effectiveness of preplanting treatments with antibiotics in preventing crown gall of Mazzard cherry (Phytopath. 46: 635).

PRUNUS CERASUS. SOUR CHERRY: Stereum purpureum, silver leaf, though present in Oregon for some 40 years, had not been observed in commercial orchards nor reported as affecting Montmorency sour cherry trees until 1954, when 14 percent of a block of 448 trees showed symptoms. In 1955 incidence seemed to be increasing, but by 1956 many trees had recovered, apparently as a result of the high summer temperatures (H. E. Williams and H. R. Cameron, PDR 40: 954).

PRUNUS DOMESTICA. ITALIAN PRUNE: Prune crinkle leaf. E. C. Blodgett reported that observations and transmission tests over a period of many years have shown that prune crinkle leaf, common on Italian Prune, is bud-perpetuated but is not caused by an agent transmissible by budding. It was concluded that this disorder is due to genetic instability (Phytopath. 47: 418).

M. J. Ceponis and B. A. Friedman reported the effect of bruising injury and storage temperature upon decay and discoloration of fresh, Idaho-grown Italian prunes on the New York City market. Penicillium, the blue mold fungus, accounted for 52.6 percent of the decay (PDR 41: 491).

PRUNUS PERSICA. PEACH: Monilinia fructicola, brown rot. In New Jersey, G. R. DiMarco and B. H. Davis reported that a series of tests were conducted during 1955 and 1956 peach seasons, using chemical dips for the control of decay of harvested fruit. Mycostatin and Dowicide A-M245 gave the best results (PDR 41: 284). In New York, M. Szkolnik and J. M. Hamilton reported brown rot control with Omadine and certain antibiotics (PDR 41: 289).

W. L. Smith and others stated that during a 4-year period 67 chemicals were tested as post harvest treatments for reduction of decay of peaches inoculated with M. fructicola and Rhizopus stolonifer. Several chemicals were effective in reducing the two types of decay. Sprays of Orthocide 50 Wettable and Isothan Q15 were equal to or better than sulfur dust in reducing brown rot; but like sulfur dust, they were ineffective against Rhizopus rot. Dowicide A spray and a combination treatment of sulfur dust followed by fumigation with tetrachloroethylene effectively reduced both brown rot and Rhizopus rot. It is not known whether these chemicals would leave toxic residues when used as indicated (Phytopath. 46: 261).

M. A. Smith and G. B. Ramsey of the Agricultural Marketing Service reported that during holding tests of South Carolina Elberta peaches in August 1953 and 1956, a type of decay on fruit that did not resemble brown rot or Rhizopus rot was observed. Inoculation tests and morphological studies of the fungus indicated that it is the species of Phomopsis that causes the constriction disease of peach trees. The fungus is referred to in current literature as Phoma persicae Sacc., but presumably it should be transferred to Phomopsis (Phytopath. 47: 446).

Taphrina deformans, leaf curl. Control in New York with Omadine was reported by M. Szkolnik and J. M. Hamilton (PDR 41: 289).

Peach yellow bud mosaic virus. At the University of California five of eight potted peach trees treated in water at different temperatures prior to inoculation with the peach yellow bud mosaic virus by rubbing with sap from infected cowpea became infected. This is believed to be the first case of sap transmission of a virus infection to fruit trees (C. E. Yarwood, PDR 40: 299).

PYRUS COMMUNIS. PEAR: Erwinia amylovora, blossom blight. Greenhouse tests on cut branches and potted pear trees for the control of blossom blight indicated that the sodium and zinc salts of 2 pyridinethione 1-oxide provide for more effective control than do bordeaux mixture and the antibiotics streptomycin, Malucidin, and griseofulvin (J. M. Hamilton and M. Szkolnik, PDR 41: 301).

Protective spraying with various formulations of streptomycin gave good control of fire blight in Bosc pears in Connecticut, according to P. M. Miller (PDR 41: 19).

Neofabraea malicorticis or N. perennans, bull's-eye rot, see under Malus sylvestris.

Pear decline. In Washington and British Columbia a problem in pear culture of considerable economic importance is referred to as pear decline. According to C. G. Woodbridge and others there are two types designated as "quick decline" and "slow decline". The cause of pear decline is unknown (PDR 41: 569). Roderick Sprague listed the fungi obtained from pear trees during studies to determine the cause of pear decline in north-central Washington (PDR 41: 74).

RIBES spp. CURRANTS AND GOOSEBERRIES. On Ribes plants, the uredial and telial stages of the white pine blister rust (Cronartium ribicola) are so similar morphologically to those of the pinyon pine blister rust fungus (C. occidentale) that, according to D. H. Ford and T. E. Rawlins, it is impractical to distinguish them routinely by their morphology. Two cytochemical methods were developed that distinguish between the telia of C. ribicola and those of C. occidentale on Ribes (Phytopath. 46: 667).

VACCINIUM spp. BLUEBERRY: Agrobacterium tumefaciens, crown gall. Bert M. Zuckerman reported that five different antibiotics tested did not suppress crown gall formation on cultivated highbush blueberry in Massachusetts (PDR 41: 674).

Mosaic and shoestring (virus diseases). Mosaic and shoestring have been observed for a number of years in various blueberry plantings in New Jersey. Shoestring was thought to be a virus disease, but mosaic referred to locally as "variegation" was thought to be a generic disorder. E. H. Varney described the symptoms of the two diseases and gave evidence, based on transmission experiments, that both were of virus origin. Both diseases are considered of minor importance at present; however, they are a potential threat to industry (Phytopath. 47: 309).

VACCINIUM MACROCARPON, CRANBERRY: According to results of preliminary tests reported by P. R. Harding, Jr., ammonia pellets do not give satisfactory control of fungal decay in packaged cranberries (PDR 41: 564).

Rots. In Massachusetts, Bert M. Zuckerman reported that over a 2-year test period fungicides applied by helicopter at concentrations of 33X and 23X gave control of cranberry rots comparable with that from fungicides applied by ground equipment at standard concentrations (PDR 41: 278).

VITIS spp. GRAPE: Botrytis cinerea, Botrytis rot, according to K. E. Nelson has been considered to be the most important form of decay of Tokay grapes in the Lodi area of California, destroying a high percentage of the crop in some years when early fall rains wet the mature unharvested fruit. The severity of the disease could not be predicted, even at the time of the rain, and control was ineffective. The histological aspects of the disease were studied to obtain better understanding of mode of infection and its effect on the host tissues. Such information should be valuable in planning control measures (Phytopath. 46: 223).

Plasmopara viticola, downy mildew. A physiological form of P. viticola was found for the first time, according to Vincent Santilli. The grape downy mildew fungus was found to occur in California only on the wild grape (Vitis californica). No authentic record of its existence on the cultivated grape (V. vinifera) was found. By means of artificial inoculations and by comparison with P. viticola from the eastern United States, it was discovered that the California fungus was a strain of P. viticola, the first so characterized, and was incapable of completing its life cycle on V. vinifera and other species of Vitis that serve as hosts of this fungus outside California. Only four species of Vitis were found susceptible to the California strain (Phytopath. 47: 30).

Boron deficiency. In San Bernardino County, California, abnormalities in the early growth of vines after midwinter pruning gave rise to a bushy habit attributable to boron deficiency, according to M. M. Barnes and W. W. Jones. One application of borax at 1 ounce per vine in January 1952 and another in November 1955, effected a complete cure (Calif. Agr. 10 (8): 12, 1956).

DISEASES OF FORAGE AND COVER CROPS

D. A. Roberts and C. H. Ward reported results of the fifth consecutive survey of diseases of forage crops in New York. Total hay losses brought about by diseases were lower in 1956 than in any previous year in which forage crop disease surveys were made in the State (PDR 40: 807).

R. A. Cappellini reported forage crop diseases in New Jersey in 1956. Only a few of the observed diseases were widespread (PDR 41: 123).

R. A. Kilpatrick reported diseases of forage crops in New England and New York in 1956 (PDR 40: 1054).

GRASSES

C. J. Gould reported results of a turf disease survey in Western Washington in 1955 and 1956. Fusarium patch (F. nivale) was the most important disease on golf greens (PDR 41: 344).

BROMUS spp. BROMEGRASS: Ustilago bullata, head smut. Jack P. Meiners reported that artificial inoculation of mountain brome seed may result in failure of otherwise effective seed treatments to control head smut (PDR 40: 734).

BROMUS CATHARTICUS. RESCUEGRASS: Ustilago bullata, head smut. Howard W. Johnson reported Lamont, a new variety of rescuegrass resistant to head smut (Phytopath. 47: 409).

ELYMUS VIRGINICUS var. GLABRIFLORUS. VIRGINIA WILD RYE: Occurrence of the nematode Radopholus gracilis in a distinctly drier environment than it is usually associated with is reported by Don C. Norton in Texas (PDR 41: 599).

FESTUCA sp., ILLAHEE FESCUE, see under Poa pratensis.

LOLIUM PERENNE. PERENNIAL RYEGRASS: Gloeotinia temulenta, blind seed disease. John R. Hardison has given a record of the very successful program for control of the blind seed disease in Oregon. In late years losses have been negligible (PDR 41: 34).

POA PRATENSIS. KENTUCKY BLUEGRASS: H. B. Couch and Herbert Cole, Jr. reported that melting-out of Kentucky bluegrass and Helminthosporium blight of Illahee fescue, caused by Helminthosporium vagans and H. dictyoides respectively, were epiphytotic in Pennsylvania during the 1956 growing season. Complete loss of stands was common, and in many areas, plantings were rendered so undesirable it was necessary that they be re-established. In replicated field tests, Acti-dione, Kromad, Omadine, Captan 50-W, and Terramycin gave highly significant reductions in intensity of the leaf spot phase of the Kentucky bluegrass disease. Yield tests showed Anti-dione to cause a temporary reduction in growth of Kentucky bluegrass, while Omadine, Kromad, and Captan 50-W brought significant increases in yield per plot. None of the materials tested gave satisfactory control of Helminthosporium blight of Illahee fescue. Terraclor was extremely phytotoxic on this species, killing approximately 50 percent of the plants in the test areas (PDR 41: 205).

LEGUMES

In greenhouse pot studies, the relative increases of populations of Belonalaimus gracilis on six different winter legumes were determined and reported by J. M. Good and G. D. Thornton in Florida (PDR 40: 1050).

GLYCINE MAX. SOYBEAN: Cercospora kikuchii. Soybean stems heavily infected with the fungus were collected from field plots at the Mississippi Experiment Station in October 1951, tied in a bundle, and hung outside the laboratory window. At 6-month intervals portions were examined for sporulation of the fungus. Conidia were abundant during the first 18 months, though generally decreasing at each successive examination. After 3 1/2 years the pathogen could still be isolated (R. A. Kilpatrick, Phytopath. 46: 58).
R. A. Kilpatrick reported that studies of the fungi associated with the flowers, pods and seeds of soybeans were made at the Delta Branch Experiment Station, Stoneville, Missis-

sippi, from 1951 to 1955. The kinds of fungi and their relative prevalence varied with season, with location within the plant, and with varieties. Cercospora kikuchii comprised the highest percentage of isolates from seed within pods. Alternaria spp. were isolated most frequently from the pistils and stamens of unopened and opened flowers. It was suggested that fungi gain entrance to soybean seed within unopened pods by the following means: 1) cracking of pod walls; 2) insect injuries, and 3) systemic infection (Phytopath. 47: 131).

Kirk L. Athow reported that observations on time and place of natural infection by the soybean stem canker fungus, Diaporthe phaseolorum var. caulivora, have been made for 8 years (Phytopath. 47: 2). Stem canker is considered one of the most destructive diseases on soybean in the north central States. F. I. Frosheiser reported studies on its etiology and epidemiology. The only known method of survival of the pathogen is in overwintered plant parts and seed. It is possible that the pathogen lives saprophytically in the soil or survives in plant material other than soybean (Phytopath. 47: 87).

Helicotylenchus nannus, spiral nematode. N. A. Minton and E. J. Cairns reported suitability of the soybean variety Ogden and twelve other plants as hosts of the spiral nematode. Various crop plants and weeds frequently found in Alabama where this nematode occurs were tested in the greenhouse as hosts (Phytopath. 47: 313).

Heterodera glycines, the soybean cyst nematode, has been found in soybean fields in Lake County, Western Tennessee. The extent of the infestation has not been determined. Investigations as to extent and area of damage are being continued (J. M. Epps, PDR 41: 33). A. H. Hegge reported that on December 5, 1956, soil collections for soybean cyst nematodes were taken from six fields in Pemiscott County, Missouri. Soil was collected from six soybean stubble fields located across the Mississippi River from the Lake County, Tennessee infestation. Examination revealed the presence of the soybean cyst nematode. During the week of December 17, soil collections were taken from 41 other fields planted to soybeans in 1956 in Pemiscott County. The soybean cyst nematode was found in eight of these fields, bringing the known total infested locations in Missouri to nine (PDR 41: 201). J. F. Spears and others reported the soybean cyst nematode found in a new area near Burgaw, North Carolina. There are now three centers of infestation in the State, comprising 79 properties and 1,687 acres (PDR 40: 830).

Meloidogyne incognita acrita. In Delaware, experiments reported by H. W. Crittenden indicated that rotation with a resistant cash crop such as resistant soybeans should be a successful and economical means of controlling this nematode (PDR 40: 977).

Rhizoctonia solani. The influence of certain plant nutrients on infection of soybeans by R. solani was reported by J. J. Castano and M. F. Kernkamp. Soybeans were inoculated with R. solani and grown in sand culture with deficiencies of calcium, magnesium, iron, sulfur, nitrogen, phosphorus, or potassium. A deficiency of any of these elements except potassium increased the severity of infection. In tests under other than deficiency conditions, the degree of infection was not influenced by the different levels of calcium and magnesium used (Phytopath. 46: 326).

At Camp Detrick, Maryland, Robert P. Kahn reported seed transmission of the tomato-ringspot virus in the Lincoln variety of soybeans. The results of his experiments confirm a previous finding of seed transmission of the tobacco-ringspot virus and represent the first report of seed transmission of the tomato-ringspot virus (Phytopath. 46: 295).

Chlorosis. In Maryland a chlorosis of the Lee soybean variety described by L. W. Erdman appeared to be associated with certain rhizobial inoculants (PDR 40: 646).

LESPEDEZA spp. BUSH CLOVER: Fusarium roseum, Rhizoctonia solani, and Pythium debaryanum, damping-off, see under Trifolium repens var. Ladino.

LESPEDEZA STIPULACEA. KOREAN LESPEDEZA: In North Carolina, annual Korean lespedeza was infected and severely defoliated by the tar spot fungus, Phyllachora lespedezae. In southeastern United States native species of lespedeza are known to be susceptible, but this is the first report of its occurrence on introduced Korean lespedeza, which is grown extensively as a hay and seed crop in this region. Damage has been most severe in breeding nurseries at Raleigh, but the disease is prevalent on Korean lespedeza throughout the State (J. L. Allison, Phytopath. 47: 2).

MEDICAGO SATIVA. ALFALFA: R. K. Stivers and others reported the relationships of varieties and fertilization to observed symptoms of root rots (Ascochyta imperfecta and Fusarium spp.) and bacterial wilt (Corynebacterium insidiosum) of alfalfa in Indiana

(Agronomy Jour. (48 (2): 71-73, 1956).

Cercospora medicaginis, black stem, is an important disease of alfalfa in Iowa according to J. W. Baxter. The fungus overwinters chiefly as mycelium in plant debris. The incidence of seed infection in alfalfa appeared to be low. In greenhouse inoculations with conidia of C. medicaginis, the fungus proved to be pathogenic to species of Medicago but failed to infect species of Melilotus and Trifolium (Phytopath 46: 398).

Corynebacterium insidiosum, bacterial wilt. The occurrence of this organism in alfalfa seed was reported by M. W. Cormack and J. E. Moffatt. It has become prevalent in many of the alfalfa-growing regions of North America during the past 25 years, and has spead erratically, as shown by its frequent appearance in areas far from any known source of infection. Seed transmission was thought to be a possible explanation, but has not been previously proved (Phytopath. 46: 407).

Xanthomonas alfalfae, bacterial leaf spot, was observed in Iowa on June 19, 1956. At first found only in experimental plots, by September the disease was observed to be present in many fields of alfalfa in the central part of the State. Damage was generally light, possibly because of the appearance of the disease late in the growing season. Stem lesions also occurred under field conditions. This is believed to be the first reported outbreak of the disease in commercial fields, and the first reported occurrence of stem lesions under field conditions (R. D. Brigham, Phytopath. 47: 309).

TRIFOLIUM PRATENSE. RED CLOVER: Viruses. N. Oshima and M. F. Kernkamp concluded that the short life of red clover plantings in Minnesota is largely due to virus infection (PDR 41: 10).

C. H. Graves, Jr and D. J. Hagedorn, reporting on the red clover vein-mosaic virus in Wisconsin, stated that the virus was endemic among leguminous weeds along roadsides and in waste places, suggesting that such plants are important in perpetuation of the virus. The virus was found in leaves and stems, in crowns, and in roots of red clover and sweet clover. Indirect evidence of overwintering of the virus in red clover, sweet clover, and alsike clover plants was obtained (Phytopath. 46: 257).

TRIFOLIUM REPENS. WHITE CLOVER: Populations of nematodes in white clover were studied during 1955-56 in field-plot fumigation experiments in Louisiana. Maximal plant growth of white clover occurred from January to June of 1956 and nematode populations likewise were highest during this period. The general trend of populations of Pratylenchus sp. and Tylenchorhynchus sp. varied with the period of maximal growth of white clover (E. J. Wehunt, Phytopath. 47: 36).

TRIFOLIUM REPENS var. LADINO, LADINO CLOVER: Fusarium roseum, Rhizoctonia solani, and Pythium debaryanum, damping off.

J. H. Graham and others reported that a series of experiments were conducted to determine the pre-emergence and postemergence damping-off of Ladino clover and of common Lespedeza by the above fungi at constant temperatures from 52° to 94° F at 7° intervals, and at three levels of soil moisture. The temperatures most favorable for radial mycelial growth of Fusarium and Rhizoctonia were near 80° and of Pythium near 87° F. Temperatures most favorable for seedling emergence of Ladino clover were 66° and 73° and for Lespedeza near 87° F. High temperatures favored the pre-emergence damping-off of Ladino clover by three fungi, and low temperatures favored pre-emergence damping-off of Lespedeza by Fusarium and Phthium. Rhizoctonia reduced the emergence of Lespedeza very little (Phytopath. 47: 182).

Viruses. K. W. Kreitlow and others reported the effect of virus infection on yield and chemical composition of Ladino white clover. From the greenhouse and field data presented it was apparent that virus infection can reduce the yielding ability of Ladino clover from 23 to 55 percent. The widespread occurrence of virus infection among the plants in the field and the substantial reduction in yielding ability that results emphasize the need for obtaining resistant plants (Phytopath. 47: 394).

VIGNA SINENSIS. COWPEA: Fusarium oxysporum f. tracheiphilum, wilt. In field and greenhouse tests of the new Giant variety of blackeye cowpea at the University of California, Riverside, D. C. Erwin and I. J. Thomason found promising resistance to F. oxysporum f.

tracheiphilum. In field tests Grant remained green, while two other varieties were dying from wilt. The variety was, however, found susceptible to nematode injury (Calif. Agri. 10 (5): 6, 1956).

DISEASES OF NUT CROPS

P. W. Miller reported the incidence of nut diseases in Oregon and Washington in 1956 (PDR 40: 965).

CARYA ILLINOENSIS. PECAN: Cladosporium effusum, scab. In Oklahoma, R. H. Converse reported that certain contact fungicides effectively prevented sporulation of the scab fungus in holdover stromata on dormant pecan nursery trees (PDR 40: 870). In 1956, J. R. Cole and A. C. Gossard reported increased virulence of scab on Stewart pecan in Mississippi, and its presence in Louisiana (PDR 40: 1120).

JUGLANS REGIA. PERSIAN WALNUT (ENGLISH WALNUT): P. W. Miller and L. F. Roth reported that the most important rootstock species in Oregon are J. hindsii and J. regia. In recent years some interest has developed in the Chinese wingnut (Pterocarya stenoptera) as a rootstock for Persian walnut. In two different greenhouse experiments inoculated potted seedlings of these two species of Juglans were found to be susceptible to Phytophthora cinnamomi. Inoculated potted seedlings of P. stenoptera did not become infected (PDR 40: 538).

B. F. Lownsbery reported the results of experiments which showed that Pratylenchus vulnus is the primary cause of the root-lesion disease of walnuts. It has been estimated that approximately 50,000 acres of Persian walnuts, in all important walnut-growing areas in California, are infested with this nematode (Phytopath. 46: 376).

Xanthomonas juglandis, walnut blight. Experiments in San Joaquin County, California, have shown that whereas control of walnut blight was poor following only one pre-bloom or post-bloom spray, good control was obtainable with one at mid-bloom, and especially with an additional post-bloom spray. Both copper A and streptomycin were effective. The former gave 92 to 95 percent control; the latter 89 percent. Dusts were less effective because of wind. No phytotoxic effects were observed on the blossom. (P. A. Ark and F. M. Charles, Calif. Agr. 10 (3): 8, 1956).

DISEASES OF ORNAMENTALS

ALOE VARIEGATA. ALOE: Pythium ultimum, root rot, described by K. F. Baker and R. D. Durbin, was responsible for a loss of several thousand seedlings in a nursery in Los Angeles, California. The disease starts at the root tips and spreads rapidly back to the stem. Infected plants which would normally be discarded may be treated by total immersion in hot water at 115° F for 30 minutes. They are then placed in or sprayed with cold water, dried, and replanted. Even large seed-bearing specimens may be saved by this method, and in such cases the treatment time may be safely extended to 40 minutes (Cactus and Succ. Jour., Los Angeles, 28(2): 45, 1956).

CHRYSANTHEMUM spp. CHRYSANTHEMUM: Itersonilia perplexans, petal blight, of chrysanthemum was reported by Louise T. Dosdall. In 1951 the fungus was isolated from blighted pompom type Chrysanthemum blossoms growing in a greenhouse in Minnesota. I. perplexans and/or its variants seem to be widely distributed, having been isolated from a wide variety of plants in the Philippines, Japan, Washington, Louisiana, New York, Minnesota, and probably England (Phytopath. 46: 231). Philip Brierley and Floyd F. Smith reported symptoms of chrysanthemum flower distortion, transmission of the virus by dodder, and heat cure of infected plants (Phytopath. 47: 448).

DIANTHUS CARYOPHYLLUS. CARNATION: E. C. Gasiorkiewicz reported that phytotoxic effects were obtained on carnation cuttings following dip treatments with Terramycin and Streptomycin S. It was surmised that the phytotoxic dosages affected the hormonal balance, influencing callus tissue and subsequent root formation (PDR 40: 421).

Alternaria dianthi, Alternaria blight. R. E. Skiver reported the use of antibiotics and fungicides in mist propagation of carnation cuttings. The system provided for introduction of antibiotics and fungicides into the mist stream. The effects of the introduced chemicals on Alternaria blight and rust (Uromyces caryophyllinus) were studied. The results showed that 1) Captan, Tomatine, Omadine 1456, Omadine 1564, and Omadine 1483 significantly reduced the incidence of Alternaria blight. 2) Carnation rust seemed to be of little importance. 3) Rooting was usually reduced in cuttings infected with A. dianthi. 4) Miller's Yellow variety tended to develop a better root system than Red Sim variety regardless of treatment when rooted under mist (PDR 40: 1074).

A. F. Schindler and R. N. Stewart reported that Fusarium wilt, F. oxysporum f. dianthi, of carnations was retarded by fungus-eating nematodes, Ditylenchus spp. (PDR 46: 469).

Pseudomonas caryophylli, bacterial wilt. R. N. Stewart and A. F. Schindler reported that carnation cuttings were inoculated with P. caryophylli after they had been inoculated with root-knot nematodes Meloidogyne hapla, M. javanica, M. incognita acrita, M. arenaria, and M. incognita, and the ectoparasitic nematodes Helicotylenchus nannus, Xiphinema diversicaudatum, and Ditylenchus sp. From the results they concluded that the significant role of the nematodes in the complex is apparently only to provide wounds for entry of the bacterial pathogen (Phytopath. 46: 219).

Uromyces caryophyllinus, rust, see under Alternaria dianthi.

GLADIOLUS spp. GLADIOLUS: Results of tests of gladiolus varieties for susceptibility to Botrytis gladiolorum, Fusarium oxysporum f. gladioli, and Curvularia trifolii were reported by W. D. McClellan and R. L. Pryor (PDR 41: 47).

Rhizopus arrhizus, soft rot. W. D. McClellan reported that soft rot may occur when freshly harvested corms are heat-cured at 85° or 95° F; the greatest amount of rot occurred at 95° F. Losses were greatest when corms were stored under humid conditions and when corms were injured. The five tested varieties of gladiolus were found to be susceptible (Phytopath. 46: 687).

Recent advances in controlling diseases of gladiolus were reported by R. O. Magie at the Gulf Coast Experiment Station, in Florida. Further studies on Stromatinia root rot of gladiolus showed that the disease was economically important only on well drained land. Plantings made early or late escaped the effects of the disease almost completely, but the production of sclerotia in the soil usually occurred whatever the time the corms were planted. Fungicidal treatment of the soil made it possible to produce flowers in heavily infested land. In one test root rot was largely controlled when Terraclor was broadcast at the rate of 200 pounds per acre and disked 6 inches deep 75 days before planting. Crag 974 and Vapam were also effective (Florida Hort Soc. Proc. 68: 373-376).

Cucumber mosaic virus. By 1955 this disease had practically disappeared from the hundreds of acres of gladiolus grown in the Portland, Oregon area. F. P. McWhorter reported a recurrence in unprecedented severity in 1956. Evidence indicates that the role of clovers and grasses as possible sources of the virus should be investigated (PDR 41: 141).

HYDRANGEA MACROPHYLLA. FLORISTS' HYDRANGEA: Ringspot (virus). According to Philip Brierley and Paul Lorentz hydrangea ringspot virus was found to be transmitted by mechanical methods and by the cutting knife, but not through seed. It produced distinctive local lesions in Gomphrena globosa after 5 to 6 days. Other local-lesion hosts were mentioned. Hydrangea ringspot was present in all commercial varieties tested. The majority of varieties were tolerant to this virus, and only Charm and Sainte Speer are known to be unsalable when infected. Tomato ringspot virus also was found to be transmitted from hydrangea to Gomphrena. No evidence was found that tomato ringspot virus is carried on the cutting knife or through seed of florists' hydrangea (Phytopath. 47: 39).

IRIS spp. IRIS: Puccinia iridis, rust. Varietal reaction suggested the possibility that a new race of P. iridis may have been concerned in an outbreak of rust observed in a Dutch iris variety test in North Carolina in 1954 (N. N. Winstead and others, PDR 40: 1112).

PAEONIA sp. PEONY: Leaf curl (virus) see under Wisteria.

PELARGONIUM spp. GERANIUM: In Connecticut, E. M. Stoddard described a Fusarium black rot of geranium cuttings and reported that both it and the bacterial black leg with which it has apparently been confused can be controlled by a mixture of oxyquinoline sulfate and streptomycin applied as a soil drench (PDR 41: 536).

Virus diseases. F. P. McWhorter reported virus diseases of geranium in the Pacific Northwest (PDR 41: 83).

PELARGONIUM HORTORUM. GERANIUM: Alternaria tenuis, leaf spot. According to D. E. Munnecke, geraniums growing in southern California fields during the winter are often severely affected with this leaf spot. The symptoms produced in artificial and natural infections are described and compared with those produced by Xanthomonas pelargonii (PDR 40: 452).

PHILODENDRON HASTATUM. PHILODENDRON: Leaf spot (physiological disorder). Leaves of Philodendron growing in the Los Angeles area often have exuding spots, frequently with necrotic centers. The spots and the sooty molds growing on the exudate often make plants unsalable, according to D. E. Munnecke and P. A. Chandler. Controlled laboratory and commercial greenhouse experiments indicated that the disease is due to stimulation by high temperatures of exudation from secretory cells located beneath the stomates. The saprophytic bacteria associated with the spots may be responsible for the necrosis. It is thought that the disease may be partially controlled by preventing extreme temperature rises during growth, and by application of fungicides to control the sooty molds that grow on the exudate (Phytopath. 47: 299).

POLYPODIACEAE. COMMON-FERN FAMILY: Smog damage to ferns in the Los Angeles area was reported by Ruth Ann Bobrov Glater. Studies to date indicated that Los Angeles smog is a complex of liquids, solids, and gases, comprising more than 50 chemical elements and compounds. Plant damage was considered to be due to certain intermediate peroxidic products resulting from the chemical combination of unsaturated hydrocarbons with ozone in the atmosphere. In the field, as well as under lath, fern leaves showed characteristic markings following a period of high smog intensity (Phytopath.46: 696).

RHODODENDRON spp. AZALEA: Paul E. Nelson and others reported occurrence of Ovulinia flower spot (Ovulinia azaleae) on Long Island, New York. According to one of the growers the disease is important at temperatures of 60° to 70° F, but the greatest loss occurred when the temperature was dropped to 50° to 60° to prevent the flowers from opening too soon (PDR 40: 1115).

ROSA spp. ROSE: Agrobacterium tumefaciens, crown gall, according to P. A. Ark and W. S. Sibray in California, causes significant losses in rose cuttings planted in soils heavily infested with the organism. Paul's Scarlet was found to be the most susceptible and Burr Multiflora the most resistant of the varieties used in experiments on control. Some control was obtained in the Manetti and Dr. Huey cuttings with streptomycin dips, but streptomycin dusts were not satisfactory. Tetracycline dips showed 67 percent control in Manetti and only 40 percent control in Paul's Scarlet (PDR 41: 451).

Diplocarpon rosae, blackspot. W. D. McClellan and others reported the relation of fungicide and miticide treatments to winter injury and spring blackspot development on roses (Phytopath. 47: 357).

Sphaerotheca spp., powdery mildew. R. S. Kirby compared results of Systox-lead arsenate, antibiotics, and sulfur for the control of powdery mildew of roses in Pennsylvania. The Systox-lead arsenate combination gave outstanding control throughout the season. (PDR 41: 534).

SAINTPAULIA IONANTHA. AFRICAN VIOLET: Botrytis cinerea, leaf rot. E. S. McDonough and R. J. McGray reported that during the course of a number of experiments designed to perfect a control of mites (apparently Tarsonemus pallidus), it was observed that elimination of mites also reduced growth of B. cinerea on African violet. Various conditions other than that caused by mite infestation would seem to favor growth of Botrytis on Saintpaulia. (Phytopath. 47: 109).

SOLANUM SARACHOIDES. HAIRY NIGHTSHADE: A sand-culture technique for the isolation of fungi associated with roots was reported by Stephen Wilhelm. After incubation in moist sterile sand, washed surface-disinfected roots were examined for resting or reproductive structures of fungi, which were then dissected or trapped out for further culturing or study. The most typical root fungus flora on the hairy nightshade, growing as a weed in strawberry fields of central coastal California, consisted of a number of pathogens better known on other hosts. Among these were Verticillium albo-atrum, pathogenic to strawberry; Colletotrichum atramentarium and Pyrenochaeta terrestris, pathogenic to onion and strawberry; Pythium ultimum, pathogenic to tomato; Macrophomina phaseoli; Fusarium roseum; a species of Phoma; and a sterile fungus pathogenic to strawberry (Phytopath. 46: 293).

STRELITZIA REGINAE. BIRD OF PARADISE: R. D. Durbin reported that hot-water seed treatment was effective for control of a troublesome root rot complex of bird-of-paradise plants. Control of the disease was not adequate at temperatures of 125° F and below. The best results were obtained using 135° for 30 minutes (PDR 40: 1116).

THALICTRUM DIOICUM. MEADOW RUE: Puccinia rubigo-vera var. tritici, (Puccinia recondita), leaf rust. In Minnesota, M. N. Levine and R. C. Hildreth reported a natural occurrence of the aecial stage of this fungus on T. dioicum, but stated that the significance of this discovery was entirely problematical (Phytopath. 47: 110).

WISTERIA sp. WISTERIA: Viruses. Wisteria mosaic and peony leaf curl are both caused by viruses that are transmissible by grafting but not by sap inoculation, according to Philip Brierley and Paul Lorentz (PDR 41: 691).

DISEASES OF SHRUBS AND TREES

G. G. Hahn reported results of investigations in this country on the life cycle and control of Phacidiopycnis pseudotsugae (Phomopsis pseudotsugae), a canker-dieback disease of conifers. Procedures to be followed in effecting control in the Northeast were outlined (PDR 41: 623).

ALBIZZIA JULIBRISSIN. MIMOSA: O. D. Morgan reported spread of mimosa wilt (Fusarium oxysporum f. perniciosum) in southern Maryland (PDR 41: 51).

CELTIS OCCIDENTALIS. HACKBERRY: Association of an eriophyid mite and a powdery mildew fungus with witches'-broom of hackberry in Illinois substantiates Kellerman and Swingle's early work but further study is needed to determine the exact cause of the disease, according to Robert Snetsinger and E. B. Himelick (PDR 41: 540).

CHAMAECYPARIS LAWSONIANA. PORT ORFORD CEDAR OR LAWSON CYPRESS: Phytophthora lateralis, root rot, has increased greatly along the southwest coast of Oregon in recent years and is now epiphytotic, according to E. J. Trione and L. F. Roth. In the summer of 1954 and in subsequent seasons aerial infections caused by Phytophthora were found on the foliage, branches and main stems of the cypress. Previously only root infection had been observed (PDR 41: 211).

FRAXINUS spp. ASH: Puccinia peridermiospora, ash rust, according to A. D. Partridge and A. E. Rich, has been reported as increasingly severe in the New England area. Greenhouse and field tests have indicated that 3 to 4 hours of high moisture conditions initiate basidiospore production, but that 6 to 8 hours of moist air and gentle air movement are necessary for infection of ash trees. The optimum temperature for basidiospore formation was found to be 54° to 70° F. Bordeaux mixture, dichlone, griseofulvin, Mycostatin, and ziram each partially controlled the disease (Phytopath. 47: 246).

JUNIPERUS COMMUNIS. COMMON JUNIPER: Phomopsis juniperovora, juniper blight, has been long recognized as a serious disease of 1- and 2-year-old junipers, as pointed out by N. E. Caroselli of the Rhode Island Agricultural Experiment Station. All chemicals tested afforded some control but those which consistently gave best results under the conditions of experiments in 1955 and 1956 were Kromad, Merbam, and WK-34 (PDR 41: 216).

LIQUIDAMBAR STYRACIFLUA. SWEETGUM: Leader dieback of sweetgum may result from infection by Diplodia theobromae under certain predisposing environmental conditions, according to successful inoculations reported by K. H. Garren (PDR 40: 1132).

LITCHI CHINENSIS. LITCHI TREES: M. Cohen reported that the most important disease of litchi trees in Florida is mushroom root rot, Clitocybe tabescens, which is present on both the east and west coasts. It has killed 25 trees in one grove on Merritt Island and destroyed many in the Sarasota area. It is also present in Pinellas County and has been reported from others. The planting on Merritt Island, consisting of 325 trees planted in 1947, was established on land from which oaks and pines had recently been cleared. The fungus had completely girdled the base of every dead litchi tree found and had spread along all the branch roots to a distance of 3 1/2 to 7 feet. The author recommended that sites for new litchi plantings should be selected in areas where oaks and other woody plants have been present for many years, or that all oak stumps and roots should be completely removed before planting. Fumigation of the soil was being tried (Florida Hort. Soc. Proc. 68: 329-332).

PINUS spp. PINE: E. Hacskaylo and J. C. Palmer reported studies on the effects of chemical soil treatments on mycorrhizal fungi and on growth of pine seedlings (PDR 41: 354). A. A. Foster reported a pathological survey of pine seedling nurseries in Georgia. Fusiform rust (Cronartium fusiforme) can be effectively controlled by spraying. Damping-off has been virtually absent in recent years, probably because of the use of a sawdust and pine straw cover. Cone rust (C. strobilinum) sometimes eliminates more than 60 percent of the slash pine (Pinus elliottii) cone crop and limits seed production. Practical control is not possible at present. The economic importance of Phomopsis juniperovora on Arizona cypress (Cupressus arizonica) has been recognized since this species is increasingly being used for Christmas trees. Both seed and soil were suspected of being sources of inoculum in the nursery. The rapid expansion of the pulp and paper industry in the Southeast has given new emphasis to the production of pine seedlings (PDR 40: 69).

Cronartium ribicola, white pine blister rust. E. P. Van Arsdel and others report studies on the effects of temperature and moisture on the spread of white pine blister rust, with particular attention to the production and germinability of spores of C. ribicola. The spread of blister rust in Wisconsin was limited principally by the lack of sufficient moisture for sporidial formation and germination. When periods of saturated air occurred, a prior period of 2 weeks with no 3 consecutive days over 28° C became important to provide production of fertile teliospores. For subsequent infection on pine, the period of 48 hours of saturated air required temperatures under 20° (Phytopath. 46: 307). The history of the white pine blister rust development in Northeastern America during the past 50 years has been traced by R. R. Hirt (Jour. For. 54 (7), 435-438, 1956).

Cronartium strobilinum, cone rust. F. F. Jewell reported the prevention of cone rust on slash pine, P. elliottii, by pollination techniques used in breeding programs. His data suggested that infection of slash pine cones by this fungus occurs during the pollinating period and that the standard practice of bagging cone flowers protects them from infection (Phytopath. 47: 242).

B. T. Chitwood and others described a new genus, Meloidodera, with the type species M. floridensis, parasitic on roots of the southern slash pine in Florida. They considered the nematode to be a link between Heterodera and Meloidogyne (Phytopath. 46: 264). Reproduction and increase of this nematode in slash pine seedlings apparently did not injure the host, according to pathogenicity tests reported by B. G. Chitwood and R. P. Esser in Florida (PDR 41:603).

Charles L. Fergus described an extreme fasciculation of pine cones. The cause of the hypertrophy was unknown (PDR 40: 752).

PLATANUS spp. SYCAMORE, PLANE TREE: Gnomonia veneta, anthracnose. H. D. Snyder reported single-spray control for G. veneta on Platanus occidentalis and P. acerifolia. Favorable results were obtained in 1955. In 1956, 31 American sycamore and 118 London plane trees were sprayed with a "delayed dormant" application of PMAS. Complete defoliation of sycamore trees was uncommon in New Jersey in 1956. Only three sprayed specimens, 75 to 100 feet in height, were moderately affected (Phytopath. 47: 246).

POPULUS TREMULOIDES. ASPEN: Hypoxylon canker of aspen. R. L. Anderson gives a popular account of the symptoms, life-cycle, distribution and control of Hypoxylon canker (H. pruinatum) of aspens. The disease is particularly common in Michigan, Wisconsin, and Minnesota (For. Pest Leaflet U. S. Dept. Agri. 6, 33 pp. 1956).

QUERCUS spp. OAK: Ceratocystis fagacearum (Endoconidiophora fagacearum), oak wilt. T. W. Bretz and T. W. Jones reported that inoculation of oak flowers with the oak wilt fungus resulted in infection of the trees (PDR 41: 545). On the other hand the wilt fungus was not found in acorns from a wilt-infected oak tree according to Bretz and W. D. Buchanan. To check if the activity shown by cultured embryos was a response to injury, acorns from a disease free black oak were plated in culture dishes. These embryos remained dormant and no "scar" tissue developed on the injured cotyledons (PDR 41: 546). Evidence of autumn infection by the oak wilt fungus in Pennsylvania was presented by W. J. Stambaugh and J. C. Nelson (PDR 40: 750).

Wilt development, host-parasite relationships, and symptom expression in bur oak (Q. macrocarpa) inoculated with C. fagacearum were studied and compared with those in infected pin oaks (Q. palustris). Major differences were attributed to the more rapid spread and corresponding general distribution of the fungus through pin oak trees as compared with generally slow spread and corresponding limited distribution of the fungus through bur oaks (J. R. Parmeter and others, Phytopath. 46: 423).

W. D. Buchanan reported evidence suggesting that the Brentid, Arrhenodes minuta, may have a role in the spread of the oak wilt disease (PDR 41: 707). Experiments made during 1953 and 1954 demonstrated that artificially contaminated nitidulids caged on suitable wounds are capable of bringing about infection of healthy oaks. Species of Nitidulidae used in successful inoculations are listed. All positive cases of insect transmission resulted from inoculations made in May and early June. Many species of insects present on the mats were the same as those found in fresh wounds. Apparently a symbiotic relationship existed between Nitidulidae and Graphium rigidum and Ophiostoma pluriannulata; the fungi are disseminated by the nitidulids, which in turn receive nutritional benefits from the two fungi. It is suggested that these two fungi are the original fungus members of the symbiotic relationship and that the oak wilt fungus is a relatively recent member. If this theory is correct, the association with C. fagacearum can be expected to become more general as time passes, with a corresponding increase in rate of spread of oak wilt. This probable increase in the association of C. fagacearum with the Nitidulidae further justifies efforts now being made to bring the disease under control as promptly as possible (Frederick F. Jewell, Phytopath. 46: 244). W. J. Stambaugh and C. L. Fergus concluded from their studies that conidial inoculum picked up by insects from mycelial mats produced in the fall fails to survive the winter on hibernating insects, whereas ascospore inoculum remains viable (PDR 40: 919).

Bert M. Zuckerman reported effects of X-rays on the germination of conidia of the oak wilt fungus (Phytopath. 47: 361). John S. Boyce, Jr. pointed out that sampling of suspected oak wilt trees by means of the increment hammer is easier and more rapid than by the usual pruning or chopping methods (PDR 40: 822). W. H. Gillespie and others reported that fall examination of 117 oaks which had shown symptoms during the summer of 1956 and from which C. fagacearum had been isolated gave further proof of the effectiveness of the deep-girdle method of controlling overland spread of oak wilt (PDR 41: 362).

E. R. Toole reported the amount of infection in bottomland red oak trees (Q. phellos and Q. nuttallii) observed two years after inoculation with Fomes phellos, Polyporus fissilis, and P. hispidus (PDR 40: 823).

C. L. Fergus reported that oak trees with roots decayed by Polyporus dryadeus may be more susceptible than unaffected trees to unfavorable environmental conditions (PDR 40: 827).

C. L. Fergus and J. E. Ibberson reported that some unknown factor was causing extensive dying of oak trees in Pennsylvania (PDR 40: 749). In August 1953, according to W. H. Gillespie reports were received of an unexplained dying of scarlet oak (Q. coccinea) in parts of West Virginia. Symptoms suggested drought injury. A similar condition had been reported in Pennsylvania, New Jersey, and New York and also was observed in parts of western Virginia during the summers of 1953, 1954, and 1956. The cause of the disease has not been determined. The author presented information related particularly to the symptoms and distribution of the disease (PDR 40: 1121).

Frost cracks, the radial splitting of tree trunks caused by sudden pronounced temperature drops, are commonly found in the northern hardwood forests, according to Charles L. Fergus. Little specific information on their importance is available. To obtain information as to their importance, about which little is known, observations were made in a central Pennsylvania woodlot. Cracks were more frequent on large trees than on smaller ones. A rather large proportion of the dominant trees had frost cracks. Many cracks heal over but the defects in the logs remain. Furthermore, healed cracks may reopen thus providing avenues of entrance for fungi that cause wood decay, wilt, or cankers (Phytopath. 46: 297).

ULMUS spp. ELM: Ceratocystis ulmi, Dutch elm disease. I. R. Schneider reported that addition of streptomycin sulfate and cycloheximide to the culture medium inhibited growth of contaminants and aided identification of the Dutch elm disease organism (PDR 40: 816). In experiments reported by A. W. Englehard common salt did not control the Dutch elm disease (PDR 40: 1005). Spread of the Dutch elm disease in North America during 1956 was reported by Francis W. Holmes. New locations were found in Delaware, Maryland, West Virginia, and Kentucky. For the first time cultures of the fungus were obtained from elms in Wisconsin (PDR 41: 634). According to R. J. Campana and J. C. Carter Dutch elm disease continued to spread into new areas of northern and western Illinois during 1955 and 1956, and increased in areas previously affected. Observations suggested that where Dutch elm disease follows the virus disease phloem necrosis, it not only exceeds the latter in the rate of increase, but obscures the presence of phloem necrosis (PDR 41: 636). H. E. Reed and H. L. Bruner reported widespread occurrence of the disease in Knox County, Tennessee (PDR 40: 756).

DISEASES OF SPECIAL CROPS

AGARICUS CAMPESTRIS. MUSHROOM: Dactylium dendroides, mildew. R. N. Goodman reported results from organic fungicides Terraclor and Dowicide A, and antifungal antibiotics Actidione, Anisomycin, Griseofulvin, Rimocidin, and Oligomycin applied as drenches to mushroom beds for control of "mildew". Terraclor at either 500 or 1000 ppm proved highly effective in controlling the disease. In addition this material was found to be equally effective against "lipstick" mold, Geotrichum sp. (PDR 40: 714).

E. B. Lambert and T. T. Ayers reported that most mushroom pests were killed by exposure to a moist heat of 130° F for 16 hours, 140° for 6 hours, or 150° for 4 hours. Exceptions were Papulaspora byssina, Chaetomium spp., and Diehliomyces microspora. The thermal death times reported did not apply to pests under dry conditions, since several of the organisms were more easily killed with heat under moist conditions than when dry (PDR 41: 348).

ARACHIS HYPOGAEA, PEANUT: K. H. Garren and G. B. Duke reported studies showing that weed-control methods affect yield of peanuts as well as incidence of stem rot (Sclerotium rolfsii) in Virginia (PDR 41: 424).

BETA VULGARIS. SUGAR BEET: Yellow vein disease (? virus). According to C. W. Bennett a disease of sugar beet characterized by yellowing of veins of the leaves, dwarfing of one side of the plant in early stages of infection, and stunting of the entire plant in later stages of development, has been reported in Arizona, California, Colorado, Kansas and New Mexico. Infected plants are damaged severely but the incidence of infection has been low, so far as reported. The causal agent is graft-transmissible in sugar beet and apparently is a virus. It was not transmitted by juice inoculation and no transmission was obtained with the common insects (PDR 40: 611).

DIOSCOREA FLORIBUNDA. YAM: Meloidogyne spp. Preliminary experiments reported by W. O. Hawley at Glenn Dale, Maryland indicated that the hot-water treatment will eliminate root knot nematodes from infected dioscorea roots. In the process of developing a crop for the production of cortisone in the United States, a large number of species of Dioscorea are cultivated at Glenn Dale (PDR 40: 1045).

GOSSYPIUM spp. COTTON: The fifth report of the Committee on Cotton Disease Losses, of the Cotton Disease Council, lists the estimated losses to the cotton crop from diseases in 1956 (PDR 41: 124).

Marvin D. Whitehead and Norman E. Brown reported results obtained from in-the-furrow application of fungicides to control the cotton seedling disease complex, damping-off and nub-root in Missouri (PDR 41: 419).

D. C. Erwin and others reported the effect of some fungicides on seedling diseases of cotton in the irrigated desert valleys of Southern California (PDR 41: 324).

L. S. Bird and others discussed some of the difficulties involved in controlling the cotton seedling-disease complex by mixing fungicides with the covering soil at planting time. Tests were made on sandy and clay soil types in Texas in 1955 and 1956 (PDR 41: 165).

In Louisiana, Fusarium oxysporum f. vasinfectum, wilt, development was studied in cotton growing in steam-sterilized soil artificially infested with populations of nematodes alone, with the fungus alone, and with combinations of nematodes and Fusarium. Pure populations of Meloidogyne incognita, M. incognita acrita, Trichodorus sp., Tylenchorhynchus sp. and Helicotylenchus sp. were used. The nematodes reproduced abundantly on cotton varieties Deltapine 15 (wilt-susceptible) and Coker 100 Wilt (wilt-resistant). Of the five nematodes used in the tests, only Meloidogyne incognita and M. incognita acrita significantly increased incidence of wilt in the two varieties. Severe injury to the cotton was recorded as a result of infestations of Meloidogyne only. Little or no injury was caused by the other three genera (W. L. Martin, L. D. Newsom, and J. E. Jones, Phytopath. 46: 285).

Host-parasite relationships of the lance nematode (Hoplolaimus coronatus) in cotton roots were investigated by L. R. Krusberg and J. N. Sasser. Under low moisture conditions cotton plants in the field were severely stunted, yellowed, and almost completely defoliated in heavily infested areas. Populations of the nematode increased on cotton in the greenhouse, with little stunting of the plants. Seed germination was not affected by the nematode. In the absence of a host plant the nematode did not reproduce. Apparently it cannot live as a saprophyte (Phytopath. 46: 505).

Rhizoctonia solani, damping-off. Field surveys to determine the cause of a cotton seedling disease in Arizona indicated that the presence of the cotton root-knot nematode, Meloidogyne incognita acrita, affects the incidence of post-emergence damping-off of cotton, primarily caused by the fungus R. solani. Field surveys and experiments showed that an increase in Rhizoctonia disease was associated with an increase in the incidence of root-knot nematodes (H. W. Reynolds and R. G. Hanson, Phytopath. 47: 256).

Leaf scald. Conditions under which cotton leaf scald occurs indicated that the injury is associated with midday rain showers followed by bright sunshine. The relation of wind to scald was also clearly indicated (PDR 40: 802).

Seedling necrosis. In Texas, C. D. Ranney and L. S. Bird reported that different combinations and rates of five fungicides were tested at two soil temperatures as possible control measures for cotton seedling necrosis. Evidence indicated that temperature does not affect the fungicidal materials directly but rather that the effect is to change the soil microflora. Pre-emergence damping-off was more severe at 70° than at 80° F, while post-emergence necrosis was higher at 80° than at 70° (PDR 40: 1032).

MENTHA PIPERITA. PEPPERMINT: According to C. A. Thomas and R. E. Webb Verticillium albo-atrum is considered to be the most serious disease of peppermint in Indiana and Michigan. They reported peppermint wilt induced by a Verticillium isolate from potato. So far as known this is the first report of a Verticillium isolate capable of inducing wilt symptoms in peppermint as well as in potato and tomato. This work and previous reports indicated that such strains of V. albo-atrum are not common (Phytopath. 46: 238).

NICOTIANA spp. TOBACCO: The Colletotrichum sp. associated with tobacco anthracnose has a wide host range, according to results of cross inoculations reported by O. D. Morgan, Jr. (PDR 40: 908).

Fusarium oxysporum var. nicotianae, Fusarium wilt. O. D. Morgan found that when rootknot nematodes (Meloidogyne spp.) and Fusarium wilt were both present, control of the nematode by soil fumigation was a definite factor in control of the wilt also (PDR 41: 27). At the Pee Dee Experiment Station in South Carolina, Q. L. Holdeman reported that the incidence of infection by F. oxysporum var. nicotianae in the susceptible Oxford 1-181 tobacco variety was increased by joint inoculation with the fungus and the tobacco stunt nematode, Tylenchorhynchus claytoni, as compared with the fungus alone. He pointed out that the presence or absence of the nematode in the soil may be one of the factors involved in the erratic development of the fungus in the field (Phytopath. 46: 129).

Meloidogyne spp. In South Carolina, T. W. Graham reported that surface drench applications with Vapam, Mylone, and N521 used alone and in combination with calcium cyanamid gave effective weed and nematode control in tobacco plant beds in 1955 and 1956 tests (PDR 40: 1041).

Peronospora tabacina, blue mold. According to reports to the Plant Disease Warning Service, blue mold of tobacco was reported present in Connecticut, Florida, Georgia, Kentucky, Maryland, Massachusetts, North Carolina, South Carolina, Tennessee, and Virginia. Damage from blue mold in 1956 was for the most part very light owing to either one or a combination of factors: 1) late appearance of initial outbreak; 2) unfavorable weather conditions for development after first appearance; 3) general and widespread use of fungicides. Ferbam and zineb gave good control, and in some areas maneb. The use of streptomycin was recorded in Massachusetts. Saul Rich and G. S. Taylor concluded that cottonseed oil may be safely mixed with certain organic fungicides for spraying tobacco foliage. It is possible that these formulations may be used successfully on other crops (PDR 41: 465). P. J. Anderson reported that on replicated, inoculated plots in tobacco beds, both streptomycin and Dithane Z-78 sprays gave good control of blue mold. The results suggested that both of these materials are fungistatic rather than fungicidal (Phytopath. 46: 240).

Results of the studies of resistance to black shank (Phytophthora parasitaca var. nicotianae) within the genus Nicotiana are reported by William Lautz (PDR 41: 95).

Pseudomonas tabaci, wildfire. In North Carolina spraying with streptomycin nitrate effectively controlled wildfire in tobacco plant beds in trials reported by Luther Shaw and others in 1956 (PDR 41: 99).

Thielaviopsis basicola, black root rot. William Lautz reported that treatment of black root rot-infested soil with Vapam, chlorobromopropene, and allyl bromide effectively controlled the disease (PDR 41: 174).

Viruses. In Wisconsin Carlos Garces-Orejuela and G. S. Pound reported the multiplication of tobacco mosaic virus in the presence of cucumber mosaic virus or tobacco ringspot virus in tobacco (Phytopath. 47: 232).

RICINUS COMMUNIS. CASTORBEAN: Tobacco ring spot virus. Castorbean was found to be susceptible to tobacco ring spot virus but not to nine other viruses with which it was inoculated. This virus was not transmitted with seed from infected plants. There were three distinct types of reaction. In varieties such as Cimarron leaf symptoms were accompanied by only slight necrosis of the epicotyl in a few plants and recovery was general; in the group represented by U. S. 49 there was extensive internal necrosis of the hypocotyl followed by death of the plants; in other varieties, such as Conner, reaction was intermediate, characterized by early killing of the growing plant (A. A. Cook, PDR 40: 606).

SACCHARUM OFFICINARUM. SUGARCANE: According to Wray Birchfield and W. J. Martin, an ectoparasitic nematode of the genus Tylenchorhynchus was found associated with diseased sugarcane roots in Louisiana. The nematode was found to reproduce on two varieties of soybean which are used in the sugarcane crop-rotation program, and on Johnson grass, which is a noxious weed in sugarcane fields of Louisiana. Other hosts included rice and sweetpotato (Phytopath. 46: 277).

DISEASES OF VEGETABLE CROPS

ALLIUM CEPA. ONION: Recent outbreaks of onion bloat, caused by Ditylenchus dipsaci, in southern New York were attributed to the planting of infected onion sets produced in the Midwest. No infestations due to infected sets occurred in 1955, presumably because of cooperation with the distributors of sets and the inspection of sets shipped to southern New York (G. D. Lewis. PDR 40: 271).

Peronospora destructor, downy mildew. S. Z. Berry and G. N. Davis reported observations on the production and germination of the downy mildew fungus which may explain occurrence of the disease in the absence of other known sources of primary inoculum (PDR 41: 3).

BRASSICA OLERACEA var. BOTRYTIS. BROCCOLI: Peronospora parasitica, downy mildew. The influence of insecticide and fungicide sprays on downy mildew of broccoli was reported by J. J. Natti and G. E. R. Hervey. Control of broccoli downy mildew in their own tests with Agri-mycin, together with the reported control of blue mold of tobacco with streptomycin, suggests that streptomycin is effective against the Peronosporaceae (Phytopath. 46: 242).

BRASSICA OLERACEA var. CAPITATA. CABBAGE: Fusarium oxysporum f. conglutinans, yellows. J. C. Walker and others reported Badger Ballhead, a new cabbage variety resistant to yellows and mosaic, derived from a cross between Wisconsin Ballhead and Wisconsin Hollander (Phytopath. 47: 269).

Pseudomonas cichorii, bacterial zonate spot, according to M. A. Smith and G. B. Ramsey, is unlike any bacterial disease previously seen on the Chicago market. The organism proved pathogenic to certain members of the Cruciferae and the Cucurbitaceae as well as to potato, tomato, pepper, bean (green), pea, beet, onion, head lettuce, and witloof chicory (Phytopath. 46: 210).

CAPSICUM FRUTESCENS. PEPPER: Meloidogyne incognita acrita, root knot. A collection of 162 varieties or strains of pepper was tested for reaction to the root-knot nematode, according to W. W. Hare. Tests were conducted in infested soil in a greenhouse bench. No variety was found to be immune, four were grouped as resistant, 14 as moderately resistant, and 135 as susceptible. Nine were not rated. In large scale tests, commercial bell varieties did not differ in degree of susceptibility. Apparently resistant individuals in susceptible lots were demonstrated to be primarily escapes (Phytopath. 46: 98).

In Mississippi, W. W. Hare reported the comparative resistance of seven pepper varieties to five root-knot nematodes, Meloidogyne incognita, M. incognita acrita, M. javanica, M. arenaria, and M. hapla (Phytopath. 46: 669).

Cucumber mosaic virus. John N. Simons reported that at least three strains of this virus were present in California Wonder pepper (C. frutescens) in the Everglades area of southern Florida. Southern cucumber mosaic virus was most prevalent. A second strain caused necrotic oak-leaf patterns on older pepper foliage and at times induced a reddish or yellowish fruit blistering. The third, least common, strain produced a calico-like foliage mottle with no apparent fruit symptoms. All three strains apparently were transmitted in a nonpersistent manner by the cotton aphid, Aphis gossypii, and the green peach aphid, Myzus persicae (Phytopath. 47: 145).

CUCURBITS. CUCUMBER, MELON, SQUASH: Occurrence and fungicidal control of watermelon foliage diseases in Florida were reported by J. M. Crall and N. C. Schenck (Phytopath. 47: 312).

Reports received by the Plant Disease Warning Service stated that in South Carolina Alternaria was present in severe form on cantaloupes and caused serious economic damage.

The cucumber anthracnose (Colletotrichum lagenarium) can be transmitted by the spotted cucumber beetle (Diabrotica undecimpunctata howardi) and occasionally with seeds, but soil infestation apparently is not a factor in initial infection, according to Louisiana experiments reported by N. L. Horn and others (PDR 41: 69).

Erysiphe cichoracearum, powdery mildew, of cucumbers is seldom of any importance in the Southeastern States, according to W. C. Barnes and W. M. Epps. South Carolina introductions and numerous breeding lines of cucumbers possess a high degree of resistance to powdery mildew (PDR 40: 1093).

Fusarium oxysporum f. cucumerinum n. f. The results of cross-inoculation tests at the University of Florida, with the Fusarium spp. causing wilt of cucumber, watermelon, and muskmelon, have been published (Phytopath. 45: 435). Since the form from cucumber differed in pathogenicity from those on watermelon and muskmelon, it has been described as a new form (Phytopath. 46: 153).

S. D. Van Gundy and J. C. Walker reported studies on the transmission, overwintering, and host range of the cucurbit angular leaf spot (Pseudomonas lachrymans). The fungus infected all species of cucurbits tested but symptoms were most severe in field and greenhouse on cucumber and Cucumis anguria (PDR 41: 137).

The susceptibility of cucumber as a host of Pseudomonas lachrymans was found to be in part dependent upon the relative level of amino nitrogen in the leaves, according to S. D. Van Gundy and J. C. Walker. Mature leaves were most resistant; leaves approaching maturity were most susceptible (Phytopath. 47: 35).

N. N. Winstead and others reported reactions of some 300 watermelon plant introductions and certain other varieties and breeding lines to downy mildew (Pseudoperonospora cubensis) in North Carolina (PDR 41: 620).

The Plant Disease Warning Service reported that in 1956 downy mildew of cucurbits occurred in the Atlantic Coast Seaboard States as far north as Massachusetts, and was also found in Kentucky. In Delaware downy mildew and anthracnose were severe on watermelon. In North Carolina downy mildew reduced yields of poor quality melons in the Castle Hayne area.

Ringspot virus. A mechanically transmitted virus was found constantly associated with pimples disease of watermelons in Oklahoma, according to R. J. Shepherd and F. B. Struble. This virus was identified as a yellow strain of the tobacco ringspot virus. It was transmitted from watermelon to watermelon in 1 of 48 trials by the differential grasshopper (Melonaplus differentialis) but not in any of 45 trials with melon aphids (Aphis gossypii). There was no evidence of transmission of this virus by watermelon seed (Phytopath. 46: 358).

In New York, R. M. Gilmer and K. D. Brase reported that the cucumber proved superior to several Prunus spp. tested as indexing hosts for stone fruit viruses (PDR 40: 767).

Western aster yellows (virus). J. H. Freitag reported that the high incidence of the disease on cucurbits prompted the study of the cause. The explanation for this high incidence and for the apparent sudden appearance of aster yellows virus on cucurbits and certain other host plants not previously recognized to be hosts of the virus is not known. The author suggests that perhaps a new strain of virus has developed; however, the virus recovered from naturally infected cucurbits does not appear to differ from western aster yellows virus as known for over 25 years in California. The most likely explanation is that during previous years environmental conditions resulted in such a low incidence of the disease that it has been unnoticed. During the past three years the high incidence might possibly be explained by environmental conditions favorable to high leafhopper populations, although no data were collected on insect numbers during the years in question (Phytopath. 46: 323).

IPOMOEA BATATAS. SWEETPOTATO: Internal cork (virus) was discovered in 1944 in South Carolina and has since spread to all the sweetpotato growing States and Territories of the United States. Recently developed indexing methods should make the investigation of this disease much easier (E. M. Hildebrand, PDR 40: 289). In 1955-56 the United States Department of Agriculture directed a survey study on the incidence, severity, and extent of dissemination of sweetpotato internal cork virosis in the 1955 crop in 21 States. E. M. Hildebrand and others analyzed the findings of this survey (PDR 40: 1097). E. M. Hildebrand reported that mechanical transmission of sweetpotato internal cork virus was aided by cysteine (Phytopath. 46: 233).

Ceratocystis fimbriata, black rot. E. M. Hildebrand described the procedure used to evaluate resistance of sweetpotato varieties and selections to black root rot, which is still one of the most destructive and widespread diseases of sweetpotatoes in the United States (PDR 41: 661).

IPOMOEA BONA-NOX x I. HEDERACEA. SCARLETT O'HARA MORNING GLORY: In extensive tests since 1954 at the Plant Industry Station, Beltsville, Maryland, E. M. Hildebrand reported that the Scarlett O'Hara morning glory was demonstrated to be a remarkably good indexing host for the sweetpotato internal cork virus (Science 123: 506, 3195, 1956).

LACTUCA SATIVA. LETTUCE: Bremia lactucae, downy mildew. R. S. Cox reported that excellent control was obtained over a two-year period with zineb and during one year with maneb. Other materials were either less effective or were objectionable because of phytotoxicity. He suggested that in disease control investigations more attention should be given to the effects of phytotoxicity on yield and quality (PDR 41: 455).

Fertilizer injury and its relationship to several previously described diseases of lettuce was reported by R. G. Grogan and F. W. Zink (Phytopath. 46: 416).

Rib discoloration, or rib blight. R. B. Marlatt and others in Arizona reported that when rib-discolored head lettuce was stored at 37°, 47°, and 50° F, the lesions became dark brown and then black at all storage temperatures. Neither the size nor the number of lesions increased significantly during storage. They pointed out that lettuce with rib discoloration was more susceptible to decay than was normal lettuce and also had a greater tendency to develop symptoms of pink rib (Phytopath. 47: 231).

LYCOPERSICON ESCULENTUM. TOMATO: A. J. Lemin and W. E. Magee reported that antifungal properties detected in leaves of tomato plants treated with cycloheximide acetate absorbed through roots are probably due to formation of free cycloheximide in the leaves (PDR 41: 449).

Alternaria solani, early blight. Curt Leben and others described a small-scale field test for the evaluation of fungicides in the control of tomato early blight. A high level of artificial inoculum was maintained by weekly applications. Bimonthly applications were less effective. Four proprietary fungicides were tested for two seasons, and the antibiotic oligomycin for one. It was pointed out that the method has merit in that land, labor, equipment, and chemical test requirements are small (Phytopath. 46: 333).

Botrytis cinerea, gray mold. In experiments reported by R. S. Cox and N. C. Hayslip several materials gave effective control. Evidence showed that repeated spraying with nabam (plus metal salts), and possibly other materials, resulted in increased gray mold incidence on stems, leaves and fruit. The high yield in the thiram-sprayed plots was attributed to control of gray mold and Rhizoctonia fruit rot without phytotoxicity (PDR 40: 718).

Cladosporium fulvum, leaf mold. In Massachusetts, E. F. Guba reported success in breeding red forcing tomatoes for resistance to this mold. The work on this project has brought advantage and security to the tomato forcing industry in New England (PDR 40: 647).

The relationship between overhead irrigation and the incidence, severity, and control of certain tomato diseases was investigated in field plot experiments. Maneb and zineb gave significant control of anthracnose (Colletotrichum phomoides) under both irrigated and non-irrigated conditions, but maneb was more satisfactory than zineb under irrigation. Both materials appeared to decrease the severity of blossom-end rot in non-irrigated plots, but neither material gave control of fruit rot (Rhizoctonia solani) (D. F. Crossan and P. J. Lloyd, PDR 40: 314).

Fusarium oxysporum f. lycopersici, wilt. W. R. Jenkins and B. W. Coursen reported experimental evidence suggesting that root-knot nematodes increase the incidence of Fusarium wilt in wilt-resistant varieties such as Rutgers and Chesapeake. In varieties lacking resistance, such as Red Beefsteak, wilting is not more severe or more rapid in the presence of these nematodes (PDR 41: 185). Glenn E. Smith reported inhibition of F. oxysporum f. lycopersici by a species of Micromonospora isolated from tomato, in Ohio (Phytopath. 47: 429).

Meloidogyne spp. I. J. Thomason and P. G. Smith discussed inheritance in a tomato line (HES 4857) of resistance to M. javanica and M. incognita var. acrita (PDR 41: 180).

Phytophthora spp., buckeye rot. Comparative control of buckeye rot of tomato by various fungicides was reported by J. D. Wilson. This disease has occurred only sporadically in Ohio. In an experimental planting sprayed for the control of anthracnose fruit rot at Wooster in 1955, the best control of buckeye rot was furnished by captan, followed by maneb. Ziram gave very poor control, but when half of it was replaced with a fixed copper in a tank-mix formulation markedly increased control of the disease resulted (Phytopath. 46: 511).

Phytophthora infestans, late blight. In the 1956 season, late blight of potato and tomato was reported to the Plant Disease Warning Service from many States and from Canada. Severity depended upon local conditions. No blight was found in either green-wrap or transplant tomato areas in Georgia where disease incidence as a whole was very light. Revocation of certification was generally due to the physical condition of the plants and to nematode infestation. Poor weather and bad growing conditions throughout the season brought about a shortage of tomato transplants. Experimental forecasting attained a wider scope this year with the addition of forecasts for the Hendersonville Mountain area of North Carolina and for East Tennessee.

In a plastic greenhouse near Blacksburg, Virginia, excessive moisture during cold weather resulted in an outbreak of tomato late blight, described by C. W. Roane, and P. H. Massey, Jr. The bottled gas heating units now being used in plastic houses do not have the capacity to permit proper ventilation during sub-freezing weather (PDR 40: 313).

Rhizopus nigricans, rot. E. E. Butler reported that in three tests copper-treated fruit wraps failed to reduce the spread of R. nigricans from fruit to fruit in green-wrap tomatoes significantly (PDR 41: 474).

Blossom-end rot. A new method of controlling blossom-end rot of tomatoes, developed at the Gulf Coast Experiment Station, Bradenton, Florida, has proved completely successful in field and greenhouse trials, according to C. M. Geraldson. It is based on the concept that the primary cause of the condition is calcium deficiency. The principal objective is maintenance of the calcium level in the soil solution at over 20 percent of the total soluble salts during the entire growing season. To do this ability to recognize the factors tending to depress calcium content is necessary, so that cultural practices can be adjusted as required (Florida Hort Soc. Proc. 68: 197-202, 1955).

Internal browning. In Pennsylvania, D. C. Wharton and J. S. Boyle reported on the pathological histology of the internal browning disease of the tomato. Abnormalities of field-grown tomato fruits affected with internal browning were studied histologically by means of unstained hand sections and stained microtome sections (Phytopath. 47: 208).

Rosette (virus complex). G. R. Doering and others have recorded the observation that tomato rosette disease is caused by a mixture of two distinct viruses, rather than by a single strain of tobacco mosaic virus as originally supposed. The disease was first observed in tomato fields in southwestern Virginia. The two viruses that in combination cause rosette are the tomato rosette strain of tobacco mosaic virus and the highly instable virus, referred to as shoestring virus, not identifiable with any heretofore described (Phytopath. 47: 310).

PHASEOLUS spp. BEAN: A. D. Davison and J. R. Vaughn reported results of screening tests with various established and experimental organic chemicals, including antibiotics, against isolates of bean root rot fungi (PDR 41: 432).

Corynebacterium flaccumfaciens, bacterial wilt. D. W. Burke and C. E. Seliskar reported that cultivator damage increased incidence of some stem and root diseases of bean in Colorado (PDR 41: 483). A study was conducted by D. W. Burke to determine the influence of soil type and cropping history on the incidence of bacterial wilt in pinto bean fields. The disease is usually found in beans grown in coarse-textured, sandy soil (PDR 41: 671).

Pellicularia filamentosa, root and stem rot. D. W. Burke reported for the first time the basidial stage of Pellicularia filamentosa on bean plants in the usually dry climate of the Rocky Mountain region. The fungus was found on many plants in fields near Greeley, Colorado, and in an experimental bean plot at Cheyenne, Wyoming, in September 1956 (PDR 41: 533).

C. M. Leach and Merle Pierpont reported seed transmission of Rhizoctonia solani in bean seed (PDR 40: 907).

Sclerotinia sclerotiorum, Sclerotinia wilt or white mold. Aerial spread by ascospores was mainly responsible for the increased prevalence of Sclerotinia wilt in bean fields in northeastern Colorado in 1956, according to D. W. Burke and others (PDR 41: 72).

PHASEOLUS LIMENSIS. LIMA BEAN: Phytophthora phaseoli, downy mildew. R. A. Hyre reported that a method has been developed for forecasting downy mildew of lima bean from rainfall and temperature data (PDR 41: 7). In greenhouse experiments streptomycin in various formulations gave good control of lima bean downy mildew; better protection resulted from a spray containing equal parts of Agri-mycin 500 and neutral copper than from either component alone (W. J. Zaumeyer and R. E. Wester, PDR 40: 776). Maneb gave best results of several materials tested for control of downy mildew in trials reported by D. F. Crossan and others (PDR 41: 156). According to reports of the Plant Disease Warning Service extremely accurate forecasting of the appearance and spread of downy mildew of lima bean in Delaware and the Eastern Shore of Maryland was obtained with the use of the mildew forecasting scheme devised by R. A. Hyre. Excellent control was obtained this year when infected lima beans were sprayed twice with tribasic copper sulfate.

Pseudomonas syringae, bacterial blight. Studies on this disease of lima bean were made by Maung M. Thaung and J. C. Walker in Wisconsin. The organism was shown to be present commonly on lima bean seed grown in the United States west of the Continental Divide. It survived in the soil during a Wisconsin winter and throughout the growing season (Phytopath. 47: 413).

PISUM SATIVUM. PEA: J. L. Lockwood and others summarized surveys that were made in 1955 and 1956 to determine the causes, prevalence, and severity of pea diseases in Michigan. Root rots proved to be by far the most important group of diseases in both years (PDR 41: 478).

Pea enation mosaic virus. F. L. McEwen and W. T. Schroeder reported experiments in which the host range of pea enation mosaic virus was studied to determine possible overwintering hosts for the virus in New York. The pea aphid (Macrosiphum pisi) was used as a vector and 14 species of the family Leguminosae were tested. Plants found susceptible included alfalfa, clover, vetch, broad bean, rough peavine, and garden pea (PDR 40: 11).

D. J. Hagedorn reported a previously undescribed nonparasitic disease of canning peas, due to water congestion, which occurred in Wisconsin. Controlled experiments indicated that the disease developed most rapidly and severely under conditions of high temperature, high soil moisture, and high relative humidity (Phytopath. 47: 14).

SOLANUM spp. Heterodera rostochiensis, golden nematode. Effects of seasonal variation in soil temperature and moisture on reproduction of the golden nematode were studied by J. M. Ferris and W. F. Mai (PDR 40: 966). In New York, J. M. Ferris reported the effect of soil temperature on the life cycle of the golden nematode in host and nonhost species. Soil temperature had a marked effect on the life cycle in the three host species of Solanum studied; in the single nonhost species of Solanum studied, temperature had only a slight effect (Phytopath. 47: 221).

SOLANUM TUBEROSUM. POTATO: J. F. Malcolmson and R. Bonde reported further tests with antibiotics and fungicides for control of bacterial and fungous decay of potato seed pieces. Tests with different antibiotics did not show any to be effective against both bacterial and fungous decay. Good control of the fungous rots were obtained with Rimocidin sulfate alone and in combination with Agrimycin 100 (PDR 40: 708).

R. D. Shealy reported that in 1955, a stem rot disease of Irish potato was severe in Ohio. Apparently, aboveground plant parts were invaded by the pathogen, but decay might extend into the roots. A bacterium that was isolated repeatedly, in 1955 and 1956, from diseased tissue incited the disease on plants in the field and greenhouse. Tubers were planted in soil collected in early March 1956, from fields in which the disease had been severe in 1955. Symptoms of the disease developed on plants growing in this soil in the greenhouse. No resistant potato varieties have been found (Phytopath. 47: 31).

Alternaria solani, early blight. In Colorado, N. R. Gerhold described a successful field technique for artificial inoculation of potato with A. solani (PDR 41: 135).

Erwinia atroseptica, black leg. Working at the Science Service Laboratory at Charlottetown, Maine, D. B. Robinson and R. R. Hurst studied the use of antibiotic treatments against black leg of potatoes. Severe attacks usually result from seed infection in Maine. With Agristrep and AS-15 agricultural streptomycin as an instant dip for seed pieces, infection was reduced from 28.5 percent in the untreated to 1 percent or nothing. Semesan Bel was less effective and neomycin sulfate of no use (Amer. Potato Jour. 33: 56). In South Carolina, under stringent experimental conditions described by W. M. Epps, bacterial decay (E. atroseptica and E. carotovora) of potato seed pieces was best controlled by streptomycin treatments (PDR 41: 148).

Phytophthora infestans, late blight (see also under tomato). In Aroostook County, Maine, there was little late blight on potato foliage in 1956, according to R. A. Hyre and R. Bonde. The estimated mean foliage blight was 2.5 percent. The rainfall-temperature method of forecasting blight was quite accurate when modified to allow for the unusually cool season (PDR 40: 1087). The influence of time and temperature on sporulation of P. infestans on potato leaves was reported by J. R. Wallin, and D. N. Polhemus (Phytopath. 47: 36). J. R. Wallin and Dale N. Polhemus reported observations on the growth and development of the late blight fungus from infected tubers in steamed soil (PDR 40: 534). In Iowa, J. R. Wallin reported results of pathogenicity studies with monozoospore lines of the potato late blight fungus and described a technique for isolating single zoospores

(PDR 41: 612). R. A. Hyre and J. D. Wilson analyzed the relation of rainfall, temperature, and late blight occurrence records for northern Ohio, as a basis for forecasting occurrence of the disease in that area (PDR 41: 616).

F. J. Stevenson and others have given details of the potato variety, Plymouth, released in April 1955, by the United States Department of Agriculture and the University of North Carolina. It is immune from P. infestans and has shown moderate resistance to Streptomyces scabies in tests in Maine, Michigan, Minnesota, Wisconsin and Wyoming. It seems superior to Irish Cobbler. They recommend that this variety should largely replace the Irish Cobbler in eastern North Carolina, where it is classified as early-maturing (Amer. Potato Jour. 33: 296-299, 1956).

H. D. Thurston and others reported the effect of location and races on the epidemiology of P. infestans (Phytopath. 47: 35).

H. C. Fink reported potato late blight control in Pennsylvania in 1956. Ten fungicides were tested as dilute sprays, 100 gallons per acre, against the fungus on Katahdin potatoes (Phytopath. 47: 244).

Stemphylium solani, gray leaf spot. According to D. M. Coe and R. A. Conover, B-622 gave outstanding control of gray leaf spot in limited trials at two locations in Florida. No phytotoxicity was observed (PDR 40: 1084).

Streptomyces scabies, scab. T. Dykstra reported that, using the vermiculite method of Houghland and Cash in a modified form, he obtained very satisfactory results in testing first-year potato seedlings for resistance to scab at the Louisiana Agricultural Experiment Station, Baton Rouge. A few months after sowing the true seed, definite information on the reactions of individual seedlings could be obtained, the first symptoms being detectible on tubers the size of a pea (Phytopath. 46: 57).

In Oregon, the early maturity disease of potato attributed principally to Verticillium albo-atrum was effectively controlled by injection of Vapam into the soil with a blade applicator ten days before planting (R. A. Young, PDR 40: 781).

Stem rot (a bacterium) was noted in Ohio in August 1955 by R. D. Shealy. Tubers were planted in soil collected in early March 1956 from fields in which the disease had been severe in 1955. The bacterium was pathogenic to many members of the Solanaceae. This appears to be a different stem rot from any described on potato (PDR 40: 667).

C. W. McAnelly and others reported the detection of potato leaf roll (virus) by paper chromatography and electrophoresis (Amer. Potato Jour. 33: 134).

SPINACIA OLERACEA. SPINACH: Peronospora effusa, downy mildew. P. G. Smith and M. B. Zahara reported the development at the University of California of a new variety of spinach immune from downy mildew. The variety, named Califlay, is a cross of the variety Viroflay with a resistant wild spinach from Iran, backcrossed to Viroflay, and is intended for use in conditions to which the latter is adapted (Calif. Agric. 10(7): 15, 1956).

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